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An Atlas of the Seasonal Distribution of Marine Fish and Invertebrates in the Southern Gulf of St. Lawrence.

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2003

Canadian Data Report of Fisheries and Aquatic Sciences 1113

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103-03943/

Canadian Data Report of Fisheries

and Aquatic Sciences No. 1113

2003

AN ATLAS OF THE SEASONAL DISTRIBUTION OF MARINE FISH AND INVERTEBRATES IN THE SOUTHERN GULF OF ST. LAWRENCE.

by

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Cat. No. Fs- 97-13/1113E ISSN 0706-6465

Correct citation for this publication:

Darbyson, E and H.P. Benoît. 2003. An atlas of the seasonal distribution of marine fish and invertebrates in the southern gulf of St. Lawrence. Can. Data Rep. Fish. Aquat. Sci. no. 1113: iii + 294 p.

ABSTRACT

Seasonal bottom-trawl surveys were conducted in the southeastern and southwestern (and central) Gulf of St. Lawrence in 1986-1987 and 1989-1992 respectively. This atlas is a collection of geographic distribution maps for all the taxa caught during these seasonal surveys. This report is intended to serve only as an atlas; interpretation of patterns in abundance and distribution necessitates :nore in-depth analysis and is beyond the scope of this report.

RÉSUMÉ

Des relevés au chalut de fond saisonniers furent effectués dans le sud-est et sud-ouest (incluant la partie centrale) du Golfe du Saint-Laurent en 1986-1987 et en 1989-1992, respectivement. Le présent atlas contient une série de cartes de la répartition géographique pour tous les organismes capturés lors de ces relevés. L'intention de ce rapport est seulement de servir comme atlas. Puisque l'interprétation de patrons et tendances dans l'abondance et la distribution des organismes requiert plus d'analyse, celle-ci n'est pas incluse dans le rapport.

INTRODUCTION

Bottom-trawl surveys have been conducted annually in the southern Gulf of St. Lawrence during the month of September since 1971. While these surveys provide a synoptic view of the fish and invertebrate assemblage for the late summer or early fall period, patterns in the geographic distribution and relative abundance of species may not represent that at other times of the year. Consequently, seasonal surveys were conducted in the southeastern Gulf of St. Lawrence in 1986-1987 and in the southwestern and central portion in 1989-1992. Geographic distribution maps stemming from the southeastern Gulf surveys have been presented and discussed previously for nine fish species by Clay (1991) and for sixteen species by Hurlbut and Benoit (2001). The present atlas is an extension of this work providing a compendium of distribution maps for all fish and invertebrate taxa that were captured at least occasionally in those six surveys. We present a similar compendium for the seven surveys conducted in southwestern and central Gulf (hereafter called the southwestern Gulf surveys). In both cases the distribution of catches is presented in $kg \cdot tow^{-1}$ and $numbers \cdot tow^{-1}$ for the finfish, allowing the reader to infer general patterns in size-dependent distribution. Maps for invertebrate species are in $kg \cdot tow^{-1}$.

This report is intended as an atlas of the seasonal geographic distribution of fish and invertebrate taxa in the southern Gulf of St. Lawrence. Interpretation of patterns of abundance and distribution necessitates more in-depth analysis and is beyond the scope of this report.

METHODS

Data presented in this atlas are from bottom-trawl surveys conducted by the *R.V. Lady Hammond* and the *C.C.G.S. Alfred Needler* in the southeastern Gulf of St. Lawrence in 1986-1987 and the southwestern Gulf in 1989-1992 (Table 1). The southeastern Gulf surveys followed a stratified, fixed-station design, whereas the southwestern surveys followed a stratified random design. In all cases, the stratification scheme adopted was that of the annual (September) bottom-trawl surveys of the southern Gulf, based on depth and geographic area (Figure 1). The southeastern surveys included sets in strata 403 and 432-439, whereas coverage of the southwestern surveys was variable among cruises, roughly covering strata 415 to 429 (Figure 2 a,b). Additional strata were sampled in August 1992 (431-434), by both the *Lady Hammond* and the *Alfred Needler* as part of a paired vessel fishing efficiency comparison (Nielsen 1994). The variability in the number of stations sampled in the surveys is due to interruptions caused by severe weather, particularly in the late fall and winter surveys. In addition to the dedicated seasonal surveys, we also present maps for the distribution of fish and invertebrates during the regular annual (September) survey in 1986 and 1987 (only strata 403 and 432-439 are presented), and in 1990 and 1992 (full surveys presented), to complete the seasonal distribution picture.

All surveys presented here followed standard protocols for the annual September bottom-trawl survey of the southern Gulf of St. Lawrence (see Hurlbut and Clay (1990) for details). The target fishing procedure was a 30-minute tow at a speed of 3.5 knots with a Western IIA bottom-trawl. All catches were therefore standardised to a 1.75 nautical mile tow. The fixed stations of the southeastern survey were designated as either

day or night stations and were only sampled during the designated time period in each survey (Clay 1991). Stations in the southwestern survey were sampled randomly in regards to time of day. Adjustments were made where applicable for differences in catchability between vessels and gear, based on comparative paired fishing experiments in 1985 and 1992 (Benoit and Swain, *in prep.*; Nielsen 1994). Likewise, adjustments for diel differences in catchability have been applied where necessary (Benoit and Swain, *submitted*). Where adjustments were applied, catches were corrected to be equivalent to day catches by the *Alfred Needler* using a Western IIA trawl.

Following the protocol for the annual September surveys, the catch from each tow was sorted by species for all the finfish and commercially important invertebrates (lobster, crabs, shrimp, and squid), and to the lowest taxonomic level possible for the other invertebrates. Species identification at sea is problematic for four fish genera in particular: *Liparis* (seasnails), *Lycodes* (eelpouts), *Sebastes* (redfish) and *Alosa* (gaspereau). While attempts were made to identify the former two genera to the species level, it is felt that this was done inconsistently and the reliability of the identification is questionable. Consequently these are grouped to the genus level in this atlas. Geographic distribution maps for *Liparis* sp. likely mainly reflect the abundance and distribution of *L. gibbus* (dusky seasnail), but may also include instances of *L. atlanticus* (Atlantic seasnail), *L. fabricii* (gelatinous seasnail) and *L. liparis* (striped seasnail). Similarly, *Lycodes* sp. includes mainly *L. lavalaei* (Laval's eelpout), *L. vahlii* (Vahl's eelpout), with a few possible instances of *L. reticulatus* (arctic eelpout), *L. pallidus* (pale eelpout) and *L. esmarki* (Vachon's eelpout). As for redfish, no attempts were made to differentiate to species in the southern Gulf surveys, although these would mainly be *S. fasciatus* and *S.*

mentella. Similarly, no attempts were made to differentiate alewife (*Alosa pseudoharengus*) and blueback herring (*A. aestivalis*), and consequently both fall under the collective name of gaspereau. Finally, barracudina have been grouped to the family level (Paralepididae). Although the vast majority of instances are of white barracudina (*Arctozenus risso*), there are a few unconfirmed records of *Paralepis coregonoides*.

While efforts were made to sort catches of all invertebrates to the lowest practical taxonomic level, a refining in the taxonomic identification of several taxa is evident in the southern Gulf survey data from 1985 to the early 1990s. As a result, distribution maps for several invertebrate taxa are provided for broad taxonomic groupings (e.g. Phylum, Class or Order) followed by maps with finer resolution (Family, Genus or Species). While the former will include all records for that level of resolution (e.g. all bivalves) the latter will only include those records where that taxon was identified at the finer taxonomic resolution (e.g. Iceland scallops). The reader should bear this in mind when looking at distribution maps for these invertebrates at finer levels of taxonomic resolution.

Separate geographic distribution maps were created for each survey (Table 1) using the ACON software package (ACON Win95 8.37, Fisheries and Oceans Canada). The plots are based on expanding circles representing the 10, 25, 50, 75 and 90th percentiles of non-zero catches, with null catches indicated by a plus (+) sign.

CONSIDERATIONS

The maps presented in this atlas reflect the seasonal distribution of marine fish and invertebrates as sampled by the bottom-trawl. Because the fishing efficiency of the

gear can vary enormously among taxa and with organism body size for example (Hurley and Myers 2001), abundances should be considered as relative. As well, the full geographic distribution of many inshore taxa may not be well represented because areas with depths less than 20 m were not covered by the survey. Finally, given the limited temporal (inter-annual) coverage of the surveys presented, we refer the reader to Benoit et al. (2003) for a depiction of long-term patterns in species distribution based on annual surveys (1971-2002).

RESULTS

The results presented in this atlas show the distribution of species caught during six bottom-trawl surveys in the southeastern Gulf between September 1986 and September 1987 and from seven surveys in the southwestern Gulf between December 1989 and September 1992. In both cases the distribution of catches is presented in kg·tow^{-1} and numbers·tow^{-1} for the finfish species, with only the former presented for invertebrate taxa. These maps are indexed in Table 2, which is organised alphabetically by Order, Family, Genus and then Species (note that Family is not displayed in the table to conserve space).

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Nielsen, G.A. 1994. Comparison of the fishing efficiency of research vessels used in the southern Gulf of St. Lawrence groundfish surveys from 1971 to 1992. Can. Tech. Rep. Fish. Aquat. Sci. 1952: 56 p.

Table 1. Timing and location of seasonal surveys conducted in the southern Gulf of St. Lawrence, including number of sets fished.

Survey abbreviation[1]	Dates	Area surveyed[2]	Number of bottom-trawl sets
H159	Sept. 03-14, 1986	NAFO 4T	69 [3]
H166	Dec. 04-09, 1986	S.E. Gulf	34
N073	Jan. 07-10, 1987	S.E. Gulf	23
H172	May 19-24,1987	S.E. Gulf	43
H174	June 17-22, 1987	S.E. Gulf	48
H179	Sept. 03-14, 1987	NAFO 4T	55 [3]
H209	Dec. 01-07, 1989	S.W. Gulf	24
H215	June 29-Jul. 6, 1990	S.W. and S.C. Gulf	70
H178	Sept. 3-20, 1990	NAFO 4T	147
H223	Nov. 20-28, 1990	S.W. and S.C. Gulf	79
N151	Apr. 18-28, 1991	S.W. and S.C. Gulf	85
H245 / N176	Aug. 01-08, 1992	S.W. and S.C. Gulf	68 / 66
N178	Sept. 5-25, 1992	NAFO 4T	169

[1] The first letter in the survey abbreviation represents the survey vessel used: H (*Lady Hammond*), N (*Alfred Needler*)

[2] NAFO 4T (annual survey of entire southern Gulf), S.E. (Southeastern Gulf), S.W. (Southwestern Gulf), S.C. (South-central Gulf)

[3] indicates number of sets plotted in the maps, which are a subset of the annual survey

Table 2. Index of species distribution maps in kg·tow^{-1} for finfish and invertebrate catches in the southeastern (Fig. a) and southwestern surveys (b). Similar figure labelling convention applied to finfish catches in numbers·tow^{-1} (Fig. c and d).

Order	Species Name	Common Name	Figure # [1]
Aulopiformes	Paralepididae	Barracudina	3 a, b, c, d
Clupeiformes	*Alosa pseudoharengus*	Gaspereau	4 a, b, c, d
	Clupea harengus	Atlantic Herring	5 a, b, c, d
Gadiformes	*Enchelyopus cimbrius*	Fourbeard Rockling	6 a, b, c, d
	Gadus morhua	Atlantic Cod	7 a, b, c, d
	Gadus ogac	Greendland Cod	8 a, b *
	Melanogrammus aeglefinus	Haddock	9 a, b, c, d
	Merluccius bilinearis	Silver Hake	10 a, b, c, d
	Phycis chesteri	Longfin Hake	11 a, b, c, d
	Pollachius virens	Pollock	12 a, b, c, d
	Urophycis tenuis	White Hake	13 a, b, c, d
	Nezumia bairdii	Marlin-Spike Grenadier	14 a, b, c, d
Gasterosteiformes	*Gasterosteus aculeatus aculeatus*	Threespine Stickleback	15 a, b, c, d
Lophiiformes	*Lophius americanus*	Monkfish	16 a, b, c, d
Myxiniformes	*Myxine glutinosa*	Northern Hagfish	17 a, b, c, d
Perciformes	*Ammodytes dubius*	Northern Sand Lance	18 a, b *
	Anarhichas lupus	Atlantic Wolffish	19 a, b, c, d
	Cryptacanthodes maculatus	Wrymouth	20 a, b, c, d
Perciformes	*Tautogolabrus adspersus*	Cunner	21 a, b, c, d
	Scomber scombrus	Atlantic Mackerel	22 a, b, c, d
	Eumesogrammus praecisus	Fourline Snakeblenny	23 a, b, c, d
	Lumpenus lampretaeformis	Snakeblenny	24 a, b, c, d
	Leptoclinus maculatus	Daubed Shanny	25 a, b, c, d
	Ulvaria subbifurcata	Radiated Shanny	26 a, b +
	Peprilus triacanthus	Butterfish	27 a, b +
	Lycodes sp.	Eelpout	28 a, b, c, d
	Zoarces americanus	Common Ocean Pout	29 a, b, c, d
	Melanostigma atlanticum	Altlantic Softpout	30 a, b *

Table II. continued.

Order	Species Name	Common Name	Figure # [1]
Pleuronectiformes	*Glyptocephalus cynoglossus*	Witch Flounder	31 a, b, c, d
	Hippoglossoides platessoides	American Plaice	32 a, b, c, d
	Hippoglossus hippoglossus	Atlantic Halibut	33 a, b, c, d
	Limanda ferruginea	Yellowtail Flounder	34 a, b, c, d
	Pseudopleuronectes americanus	Winter Flounder	35 a, b, c, d
	Reinhardtius hippoglossoides	Greendland Halibut	36 a, b, c, d
	Scophthalmus aquosus	Windowpane	37 a, b, c, d
Rajiformes	*Amblyraja radiata*	Thorny Skate	38 a, b, c, d
	Leucoraja ocellata	Winter Skate	39 a, b, c, d
	Malacoraja senta	Smooth Skate	40 a, b, c, d
		Skate Egg Cases	40 e [Φ]
Osmeriformes	*Mallotus villosus*	Capelin	41 a, b, c, d
	Osmerus mordax mordax	Rainbow Smelt	42 a, b, c, d
Scorpaeniformes	*Leptagonus decagonus*	Atlantic Sea Poacher	43 a, b [*]
	Aspidophoroides monopterygius	Alligatorfish	44 a, b, c, d
	Artediellus uncinatus	Arctic Hookear Sculpin	45 a, b, c, d
	Hemitripterus americanus	Sea Raven	46 a, b, c, d
	Myoxocephalus octodecemspinosus	Longhorn Sculpin	47 a, b, c, d
	Myoxocephalus scorpius	Shorthorn Sculpin	48 a, b, c, d
	Triglops murrayi	Mailed Sculpin	49 a, b, c, d
	Cyclopterus lumpus	Lumpfish	50 a, b, c, d
	Eumicrotremus spinosus	Atlantic Spiny Lumpsucker	51 a, b, c, d
	Liparis sp.	Unidentified Seasnail	52 a, b, c, d
	Sebastes sp.	Unseparated Redfish	53 a, b, c, d
Squaliformes	*Centroscyllium fabricii*	Black Dogfish	54 a, b, c, d
	Squalus acanthias	Spiny Dogfish	55 a, b, c, d

Phylum/Class	Taxonomic Resolution	Common Name	Figure #
		Unspecified Marine Invertebrates	56 a, b
Ascidiacea	Tunicata	Tunicates	57 a, b

Table II continued.

Phylum/Class	Taxonomic Resolution	Common Name	Figure #
Crustacea	Decapoda	Decapod Shrimp	58 a, b
	Pandalidae	Pandalid Shrimp	59 a, b
	Crangonidae	Snapping Shrimp	60*
	Cancer borealis	Jonah Crab	61*
	Cancer irroratus	Atlantic Rock Crab	62 a, b
	Hyas sp.	Toad Crabs	63 a, b
	Chionoectes opilio	Snow Crab	64 a, b
	Lithodes maja	Northern Stone Crab	65 a, b
	Homarus americanus	Lobster	66 a, b
	Paguroidae	Hermit Crabs	67 a, b
Polycheata	Polycheata	Bristle Worms	68 *
	Aphrodita sp.	Sea Mice	69 a, b
Mollusca	Mollusca	Molluscs	70 *
Gastropoda	Gastropoda	Snails and Slugs	71 a, b
	Buccinum sp.	Welks	72 a, b
Bivalvia	Bivalvia	Bivalve Molluscs	73 a, b
	Arctica islandica	Ocean Quahog	74 a, b
	Cardiidae	Cockles	75 a, b
	Pectinidae	Scallops	76 a, b
	Placopecten magellanicus	Sea Scallop	77 a, b
	Chlamys islandicus	Iceland Scallop	78 a, b
Cephalopoda	Ommastrephidae, Loliginidae	Nonspecifed Squid	79 *
	Illex illecebrosus	Short-Finned Squid	80 a, b
	Loligo pealei	Long-Finned Squid	81 a, b
	Octopoda	Octopus	82 a, b
Polyplacophora	Polyplacophora	Chitons	83 *
Echinodermata	Echinodermata	Echinoderms	84 a, b
Stelleroidea	Asteroidea	Starfish	85 a, b
	Solaster sp.	Sun Stars	86 a, b
	Ctenodiscus crispatus	Mud Star	87 a, b
	Ophiuroidea	Brittle Stars	88 a, b
	Gorgonocephalida and Asteronychidae	Basket Stars	89 a, b

Table II. continued

Phylum/Class	Taxonomic Resolution	Common Name	Figure #
Echinoidea	*Strongylocentrotus* sp.	Sea Urchins	90 a, b
	Clypeasteroida	Sand Dollars	91 a, b
Holothuroidea	Holothuroidea	Sea Cucumbers	92 a, b
Anthozoa	Anthozoa	Sea Anemones	93 a, b
	Pennatula borealis	Great Sea Pen	94 a, b
Scyphozoa	Scyphozoa	Large Jellyfish	95 a, b
Porifera	Porifera	Sponges	96 a, b
Thallophyta	Thallophyta	Algae and Kelp	97 a, b

[1] The distribution maps for taxa indicated by (+) are catches in $kg \cdot tow^{-1}$ (Fig a.) and numbers$\cdot tow^{-1}$ (b) for the southeastern survey only. Similarly maps for taxa indicated by (*) are for the southwestern survey only. Φ - skate egg cases ($kg \cdot tow^{-1}$) were not identified to species and were only enumerated in the southwestern survey.

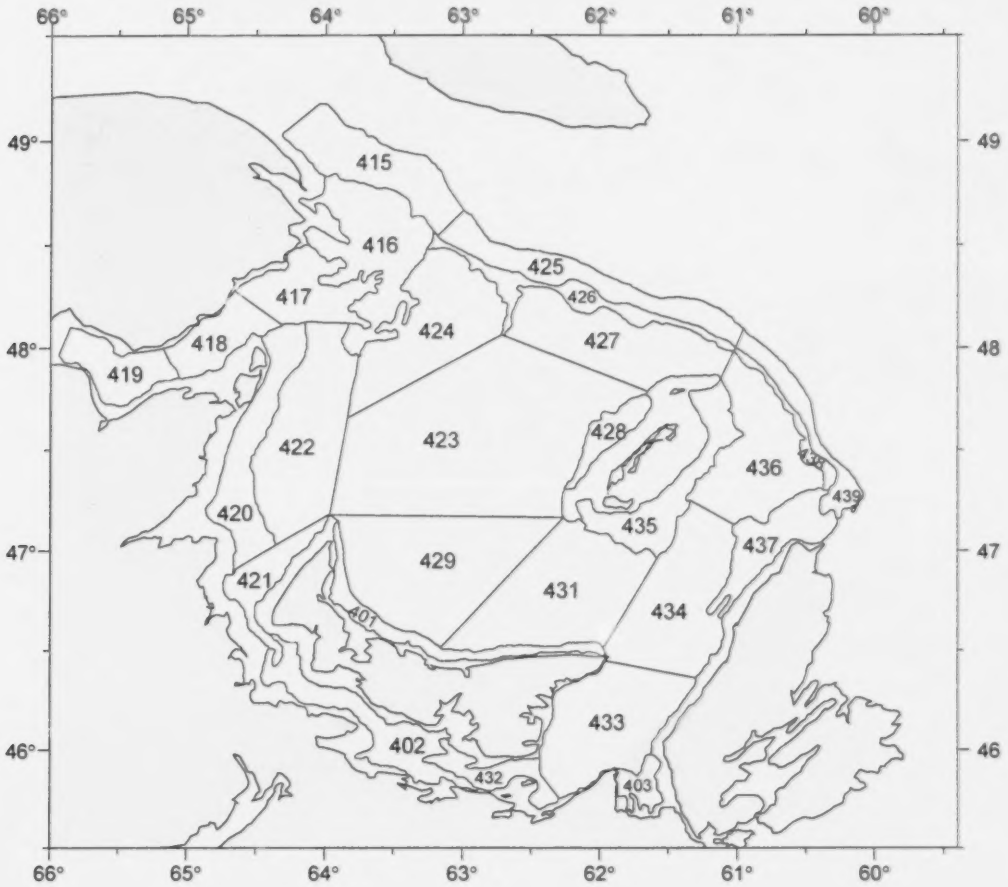

Figure 1. Stratum boundaries for the September bottom-trawl survey of the southern Gulf of St. Lawrence.

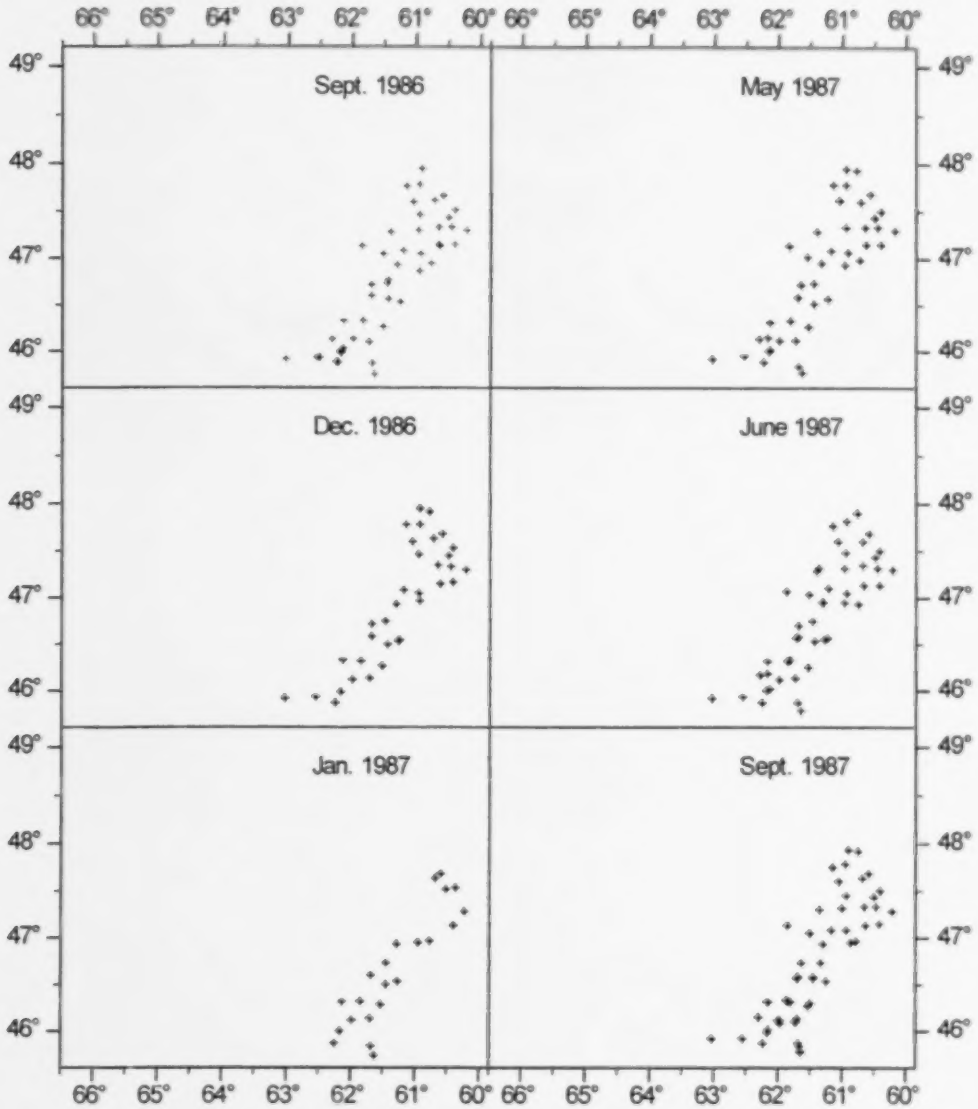

Figure 2a. Stations sampled during the S.E. Gulf of St. Lawrence seasonal surveys (1986-1987).

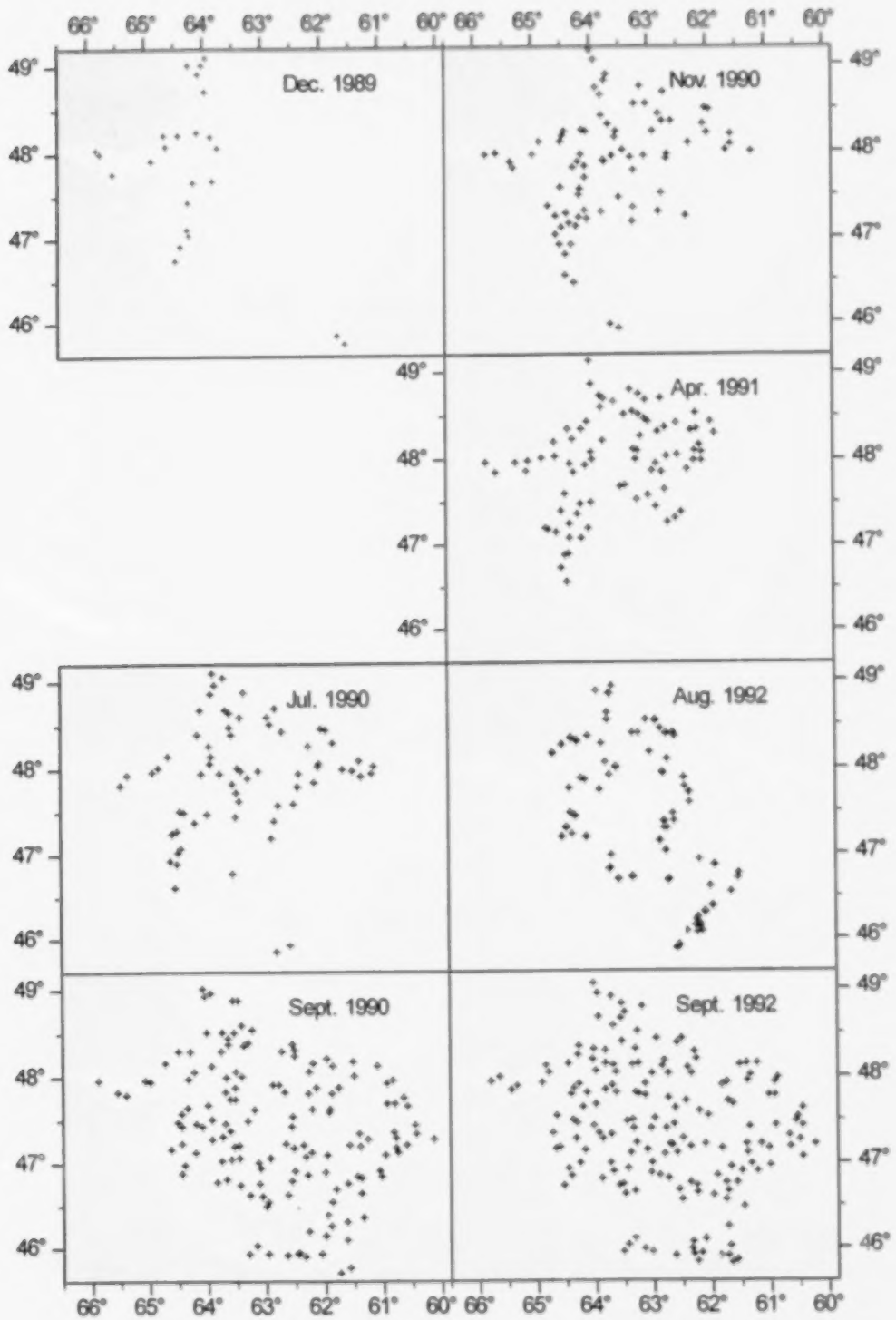

Figure 2b. Stations sampled during the S.W. Gulf of St. Lawrence seasonal surveys (1989-1992).

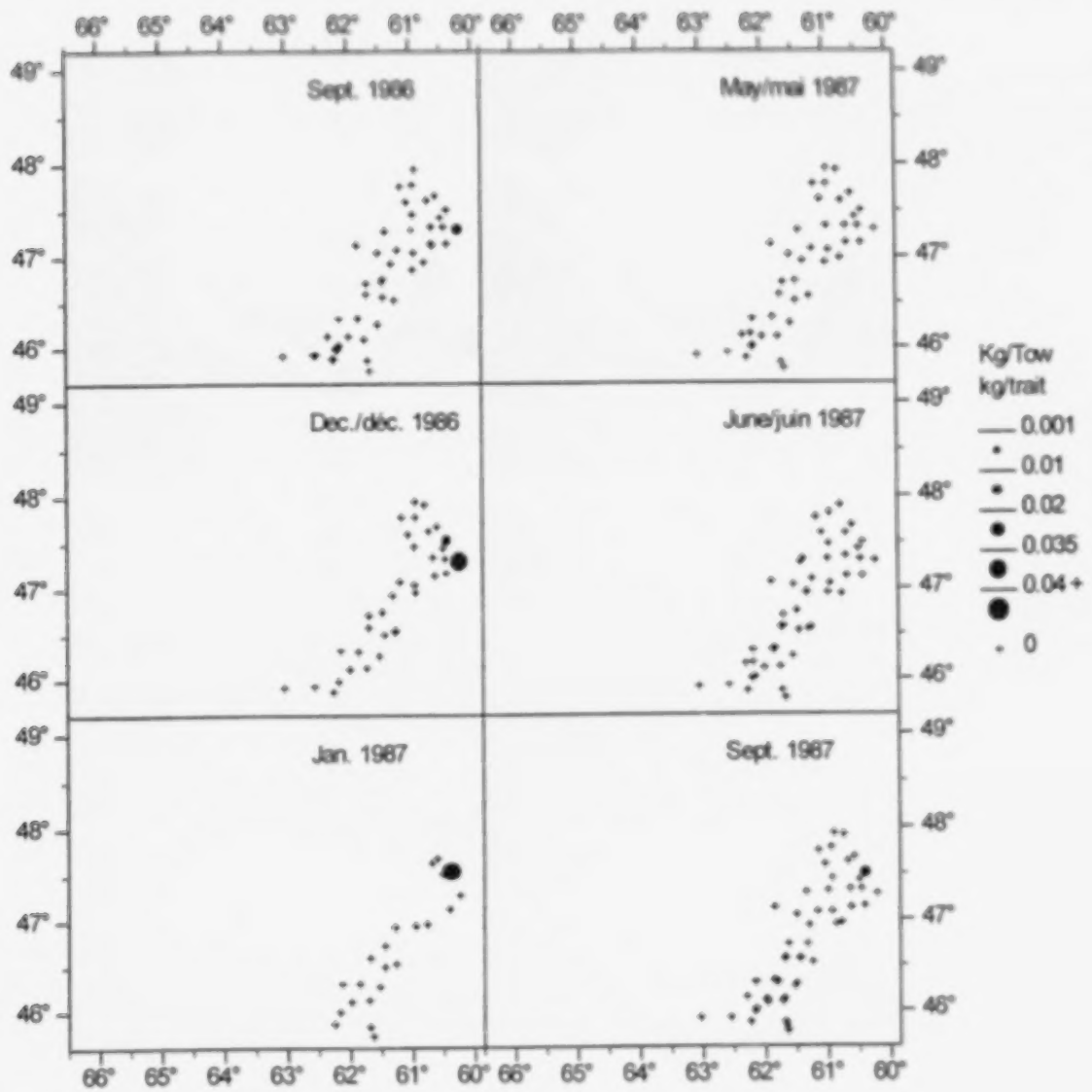

Figure 3a. S.E. Gulf of St. Lawrence seasonal distribution of catches (kg/tow) of Barracudina, *Paralepididae sp.*

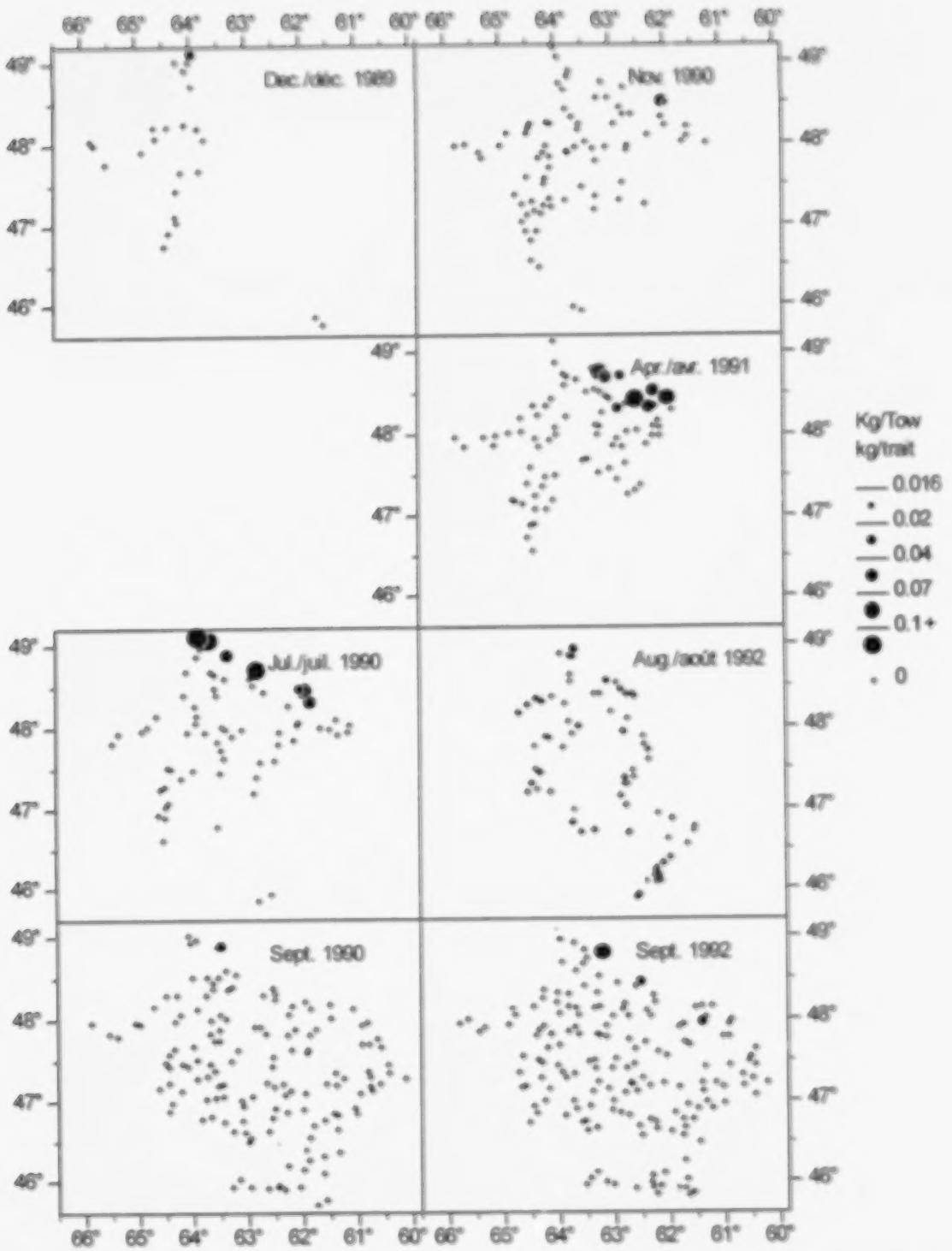

Figure 3b. S.W. Gulf of St. Lawrence seasonal distribution of catches (kg/tow) of Barracudina, *Paralepididae sp.*

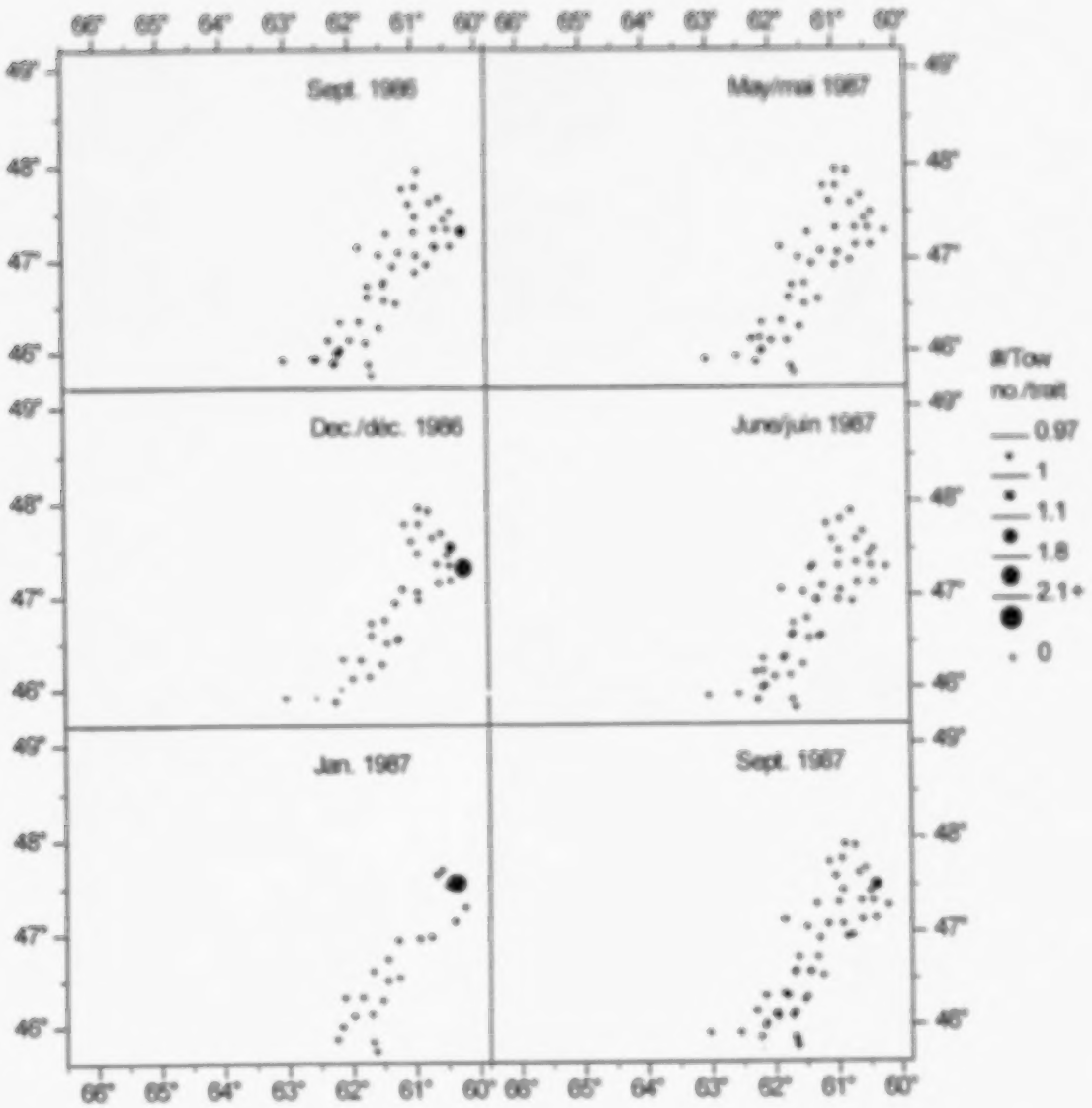

Figure 3c. S.E. Gulf of St. Lawrence seasonal distribution of catches (#/tow) of Barracudina, *Paralepididae sp.*

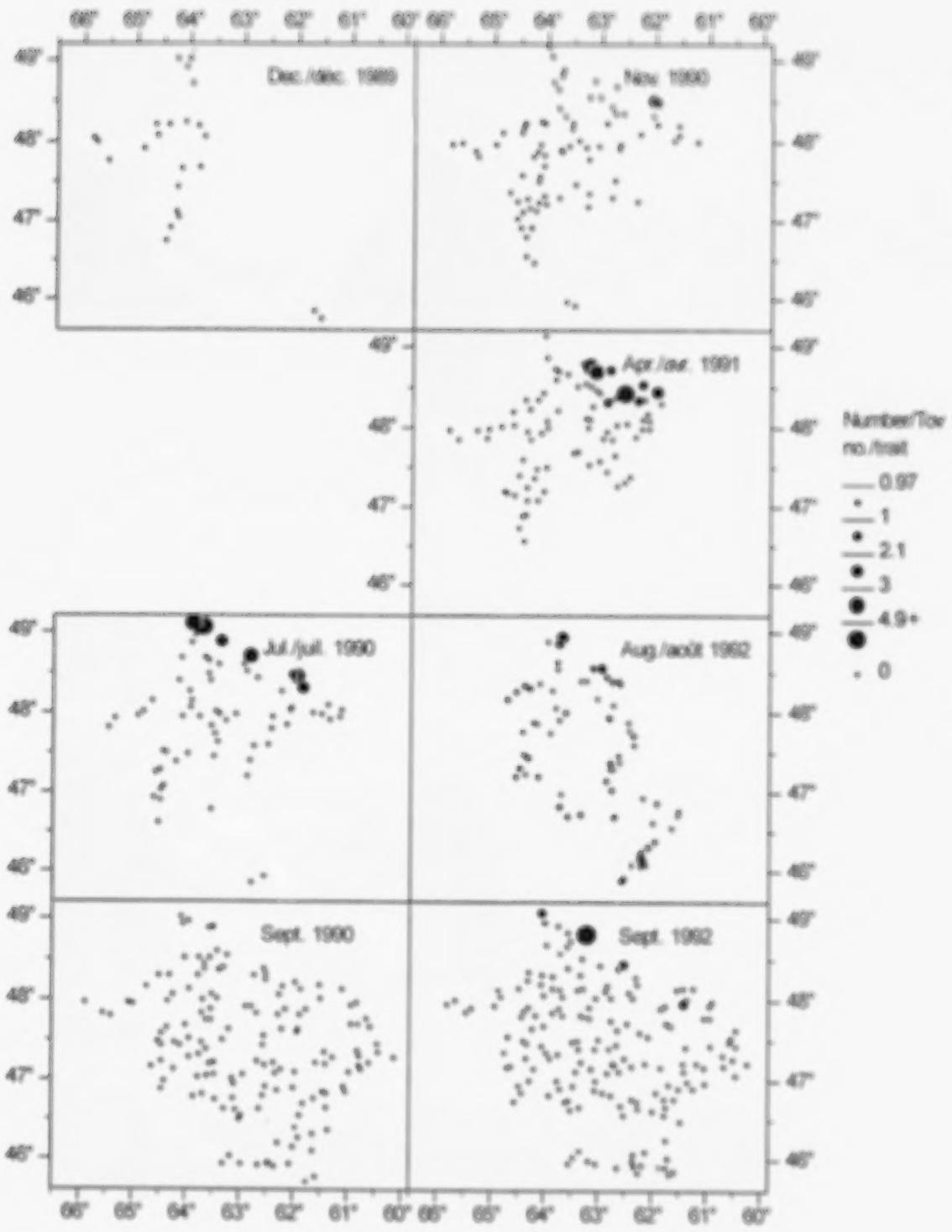

Figure 3d. S.W. Gulf of St. Lawrence seasonal distribution of catches (#/tow) of Barracudina, *Paralepididae sp.*

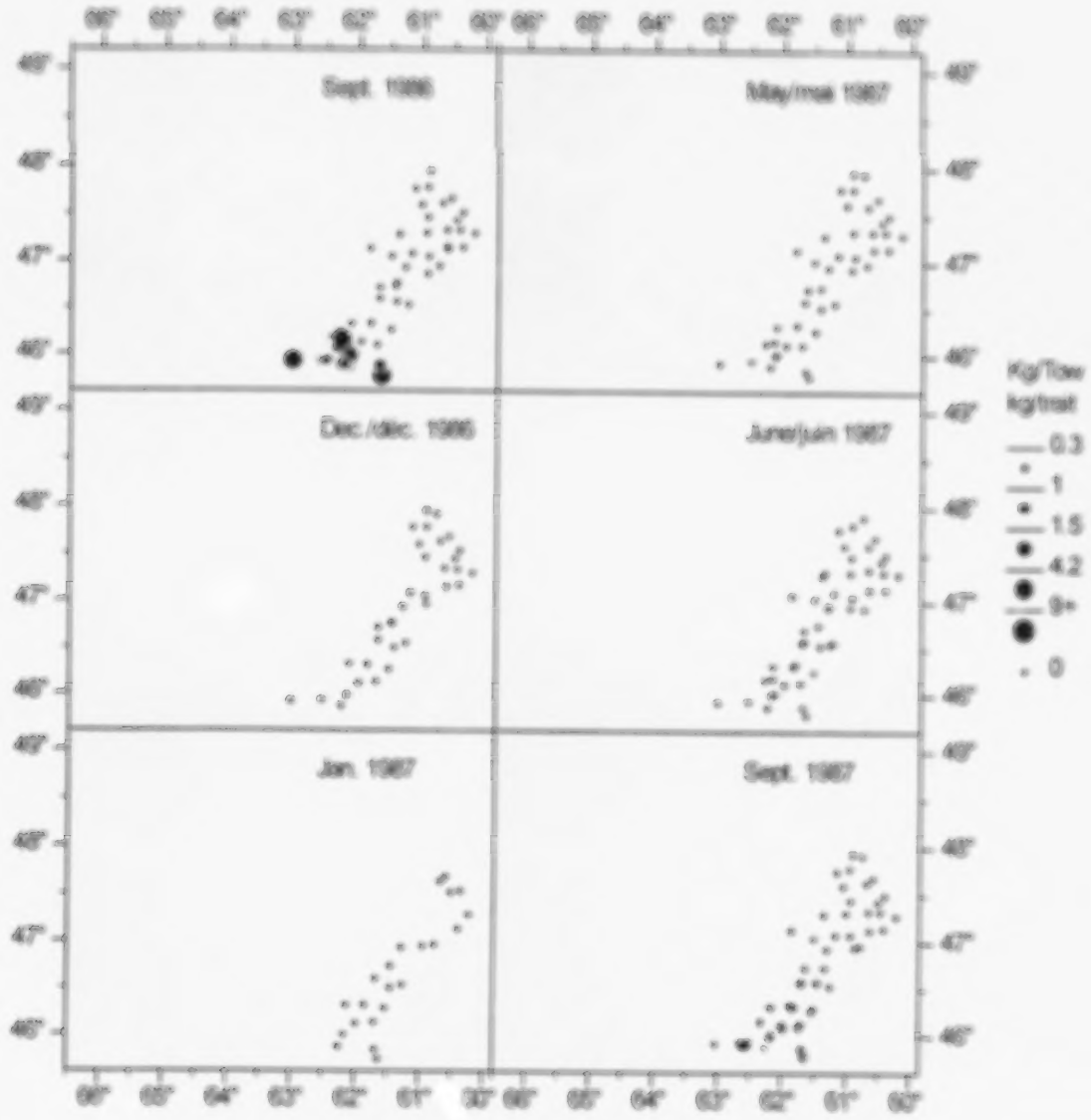

Figure 4a. S.E. Gulf of St. Lawrence seasonal distribution of catches (kg/tow) of Gaspereau, *Alosa pseudoharengus*

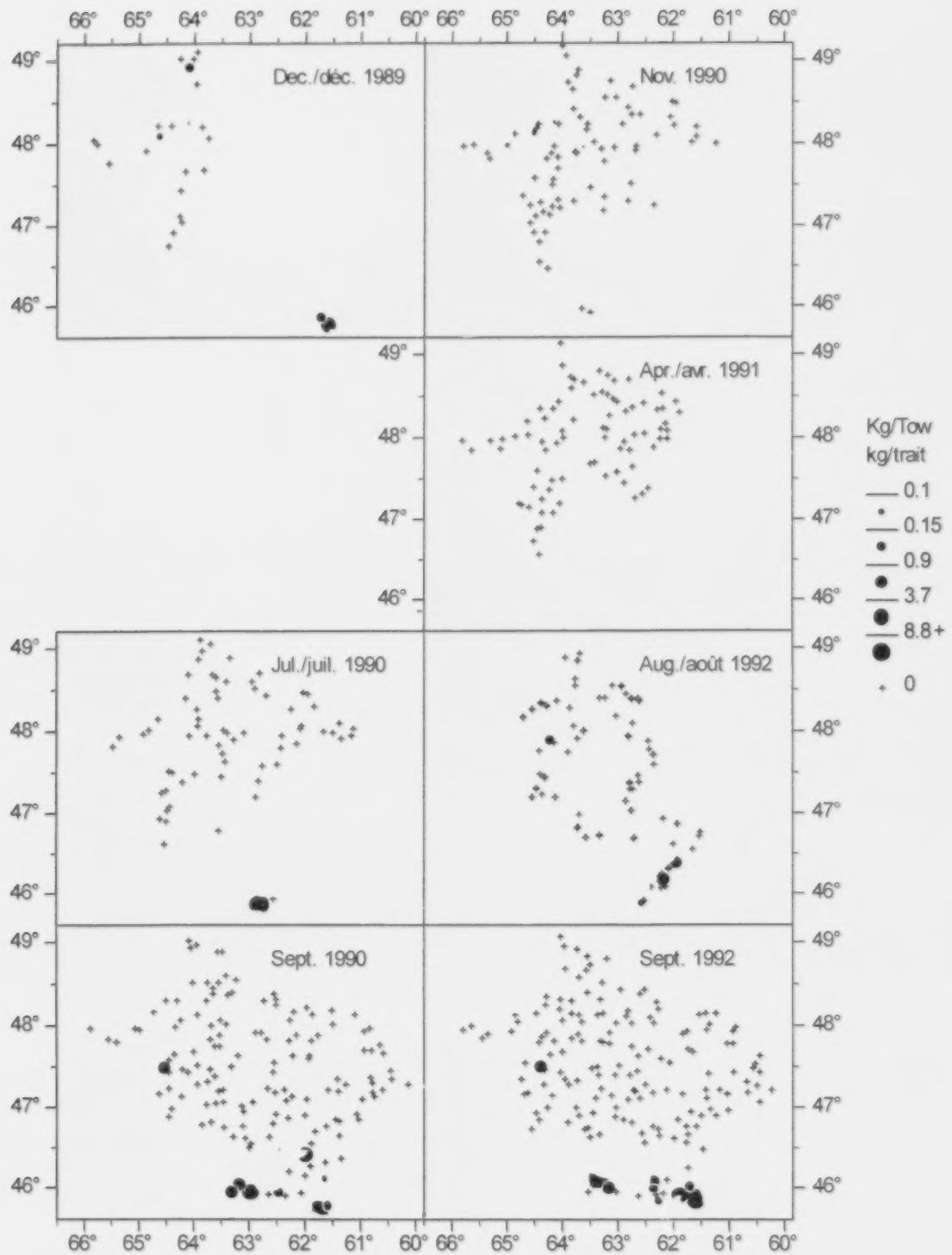

Figure 4b. S.W. Gulf of St. Lawrence seasonal distribution of catches (kg/tow) of Gaspereau, *Alosa pseudoharengus*

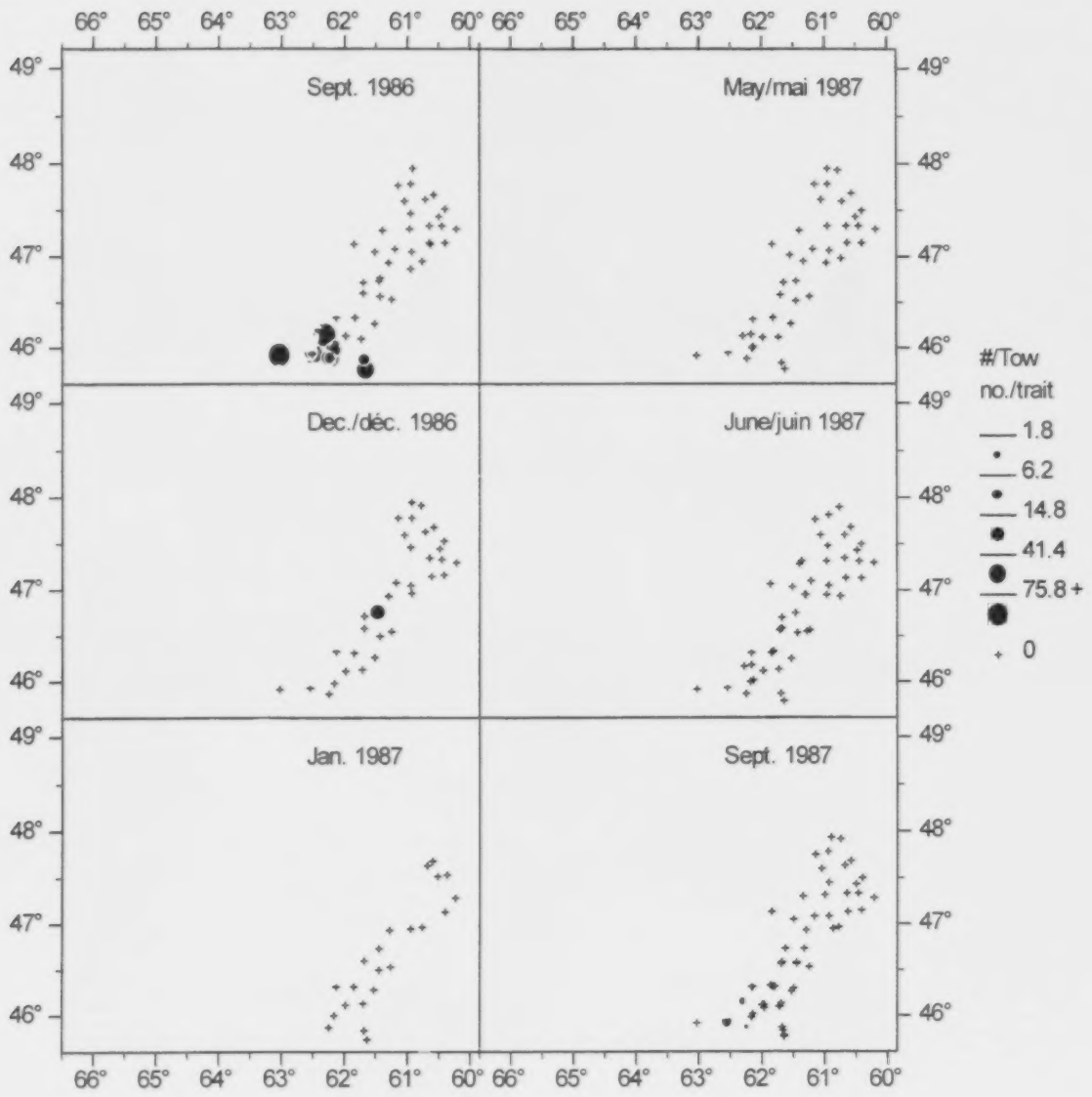

Figure 4c. S.E. Gulf of St. Lawrence seasonal distribution of catches (#/tow) of Gaspereau, *Alosa pseudoharengus*

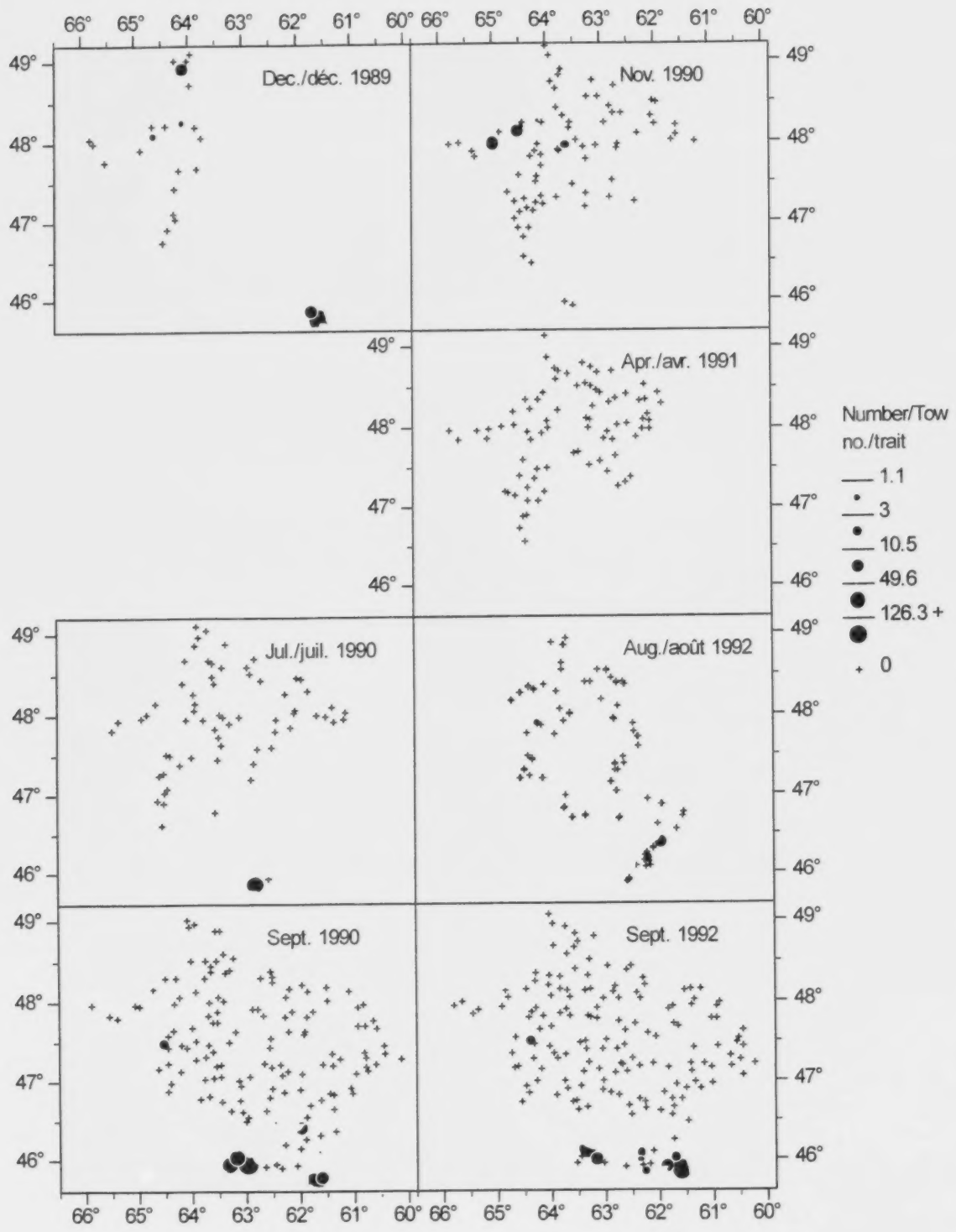

Figure 4d. S.W. Gulf of St. Lawrence seasonal distribution of catches (#/tow) of Gaspereau, *Alosa pseudoharengus*

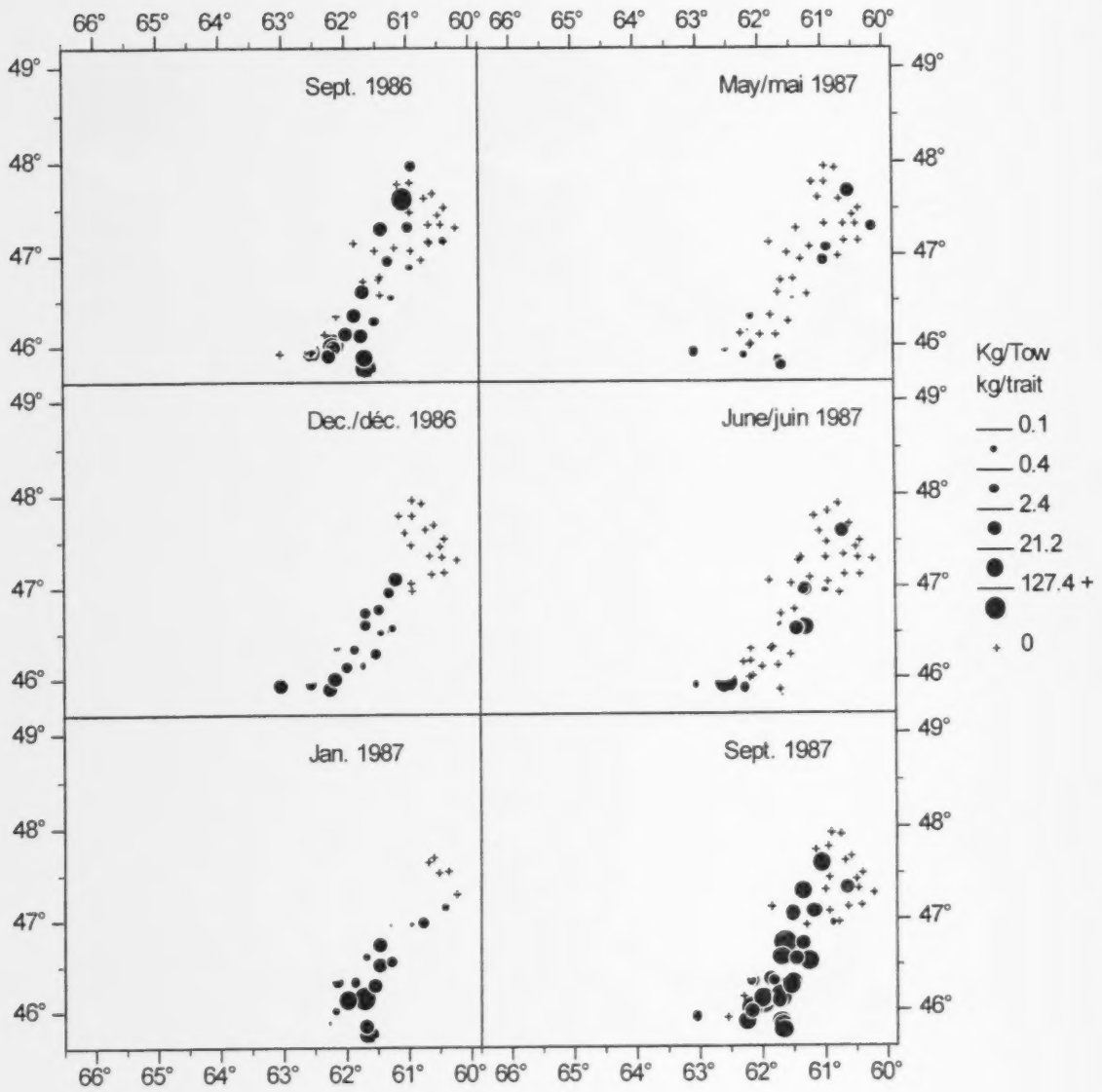

Figure 5a. S.E. Gulf of St. Lawrence seasonal distribution of catches (kg/tow) of Atlantic Herring, *Clupea Harengus*

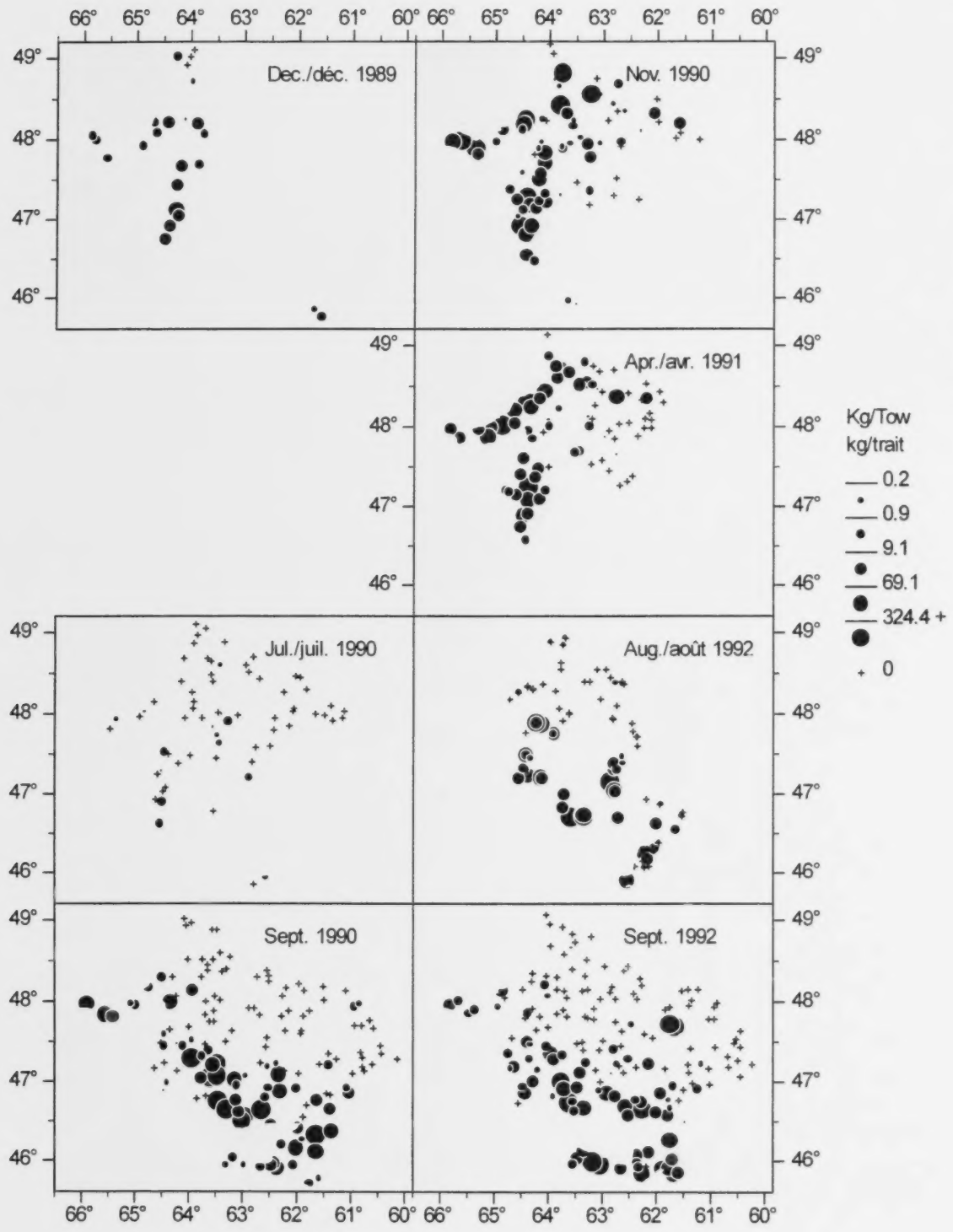

Figure 5b. S.W. Gulf of St. Lawrence seasonal distribution of catches (kg/tow) of Atlantic Herring, *Clupea harengus*

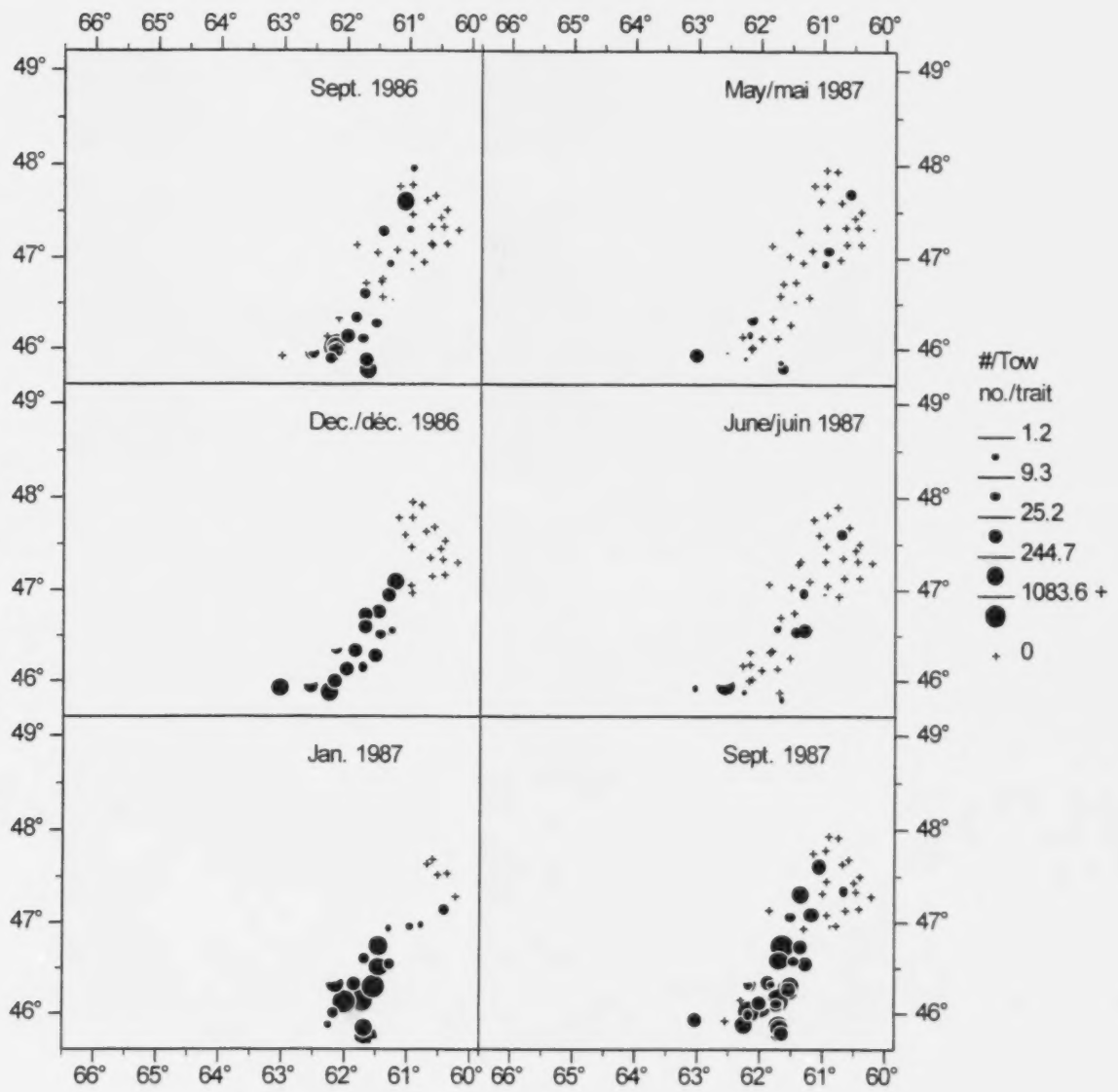

Figure 5c. S.E. Gulf of St. Lawrence seasonal distribution of catches (#/tow) of Atlantic Herring, *Clupea harengus*

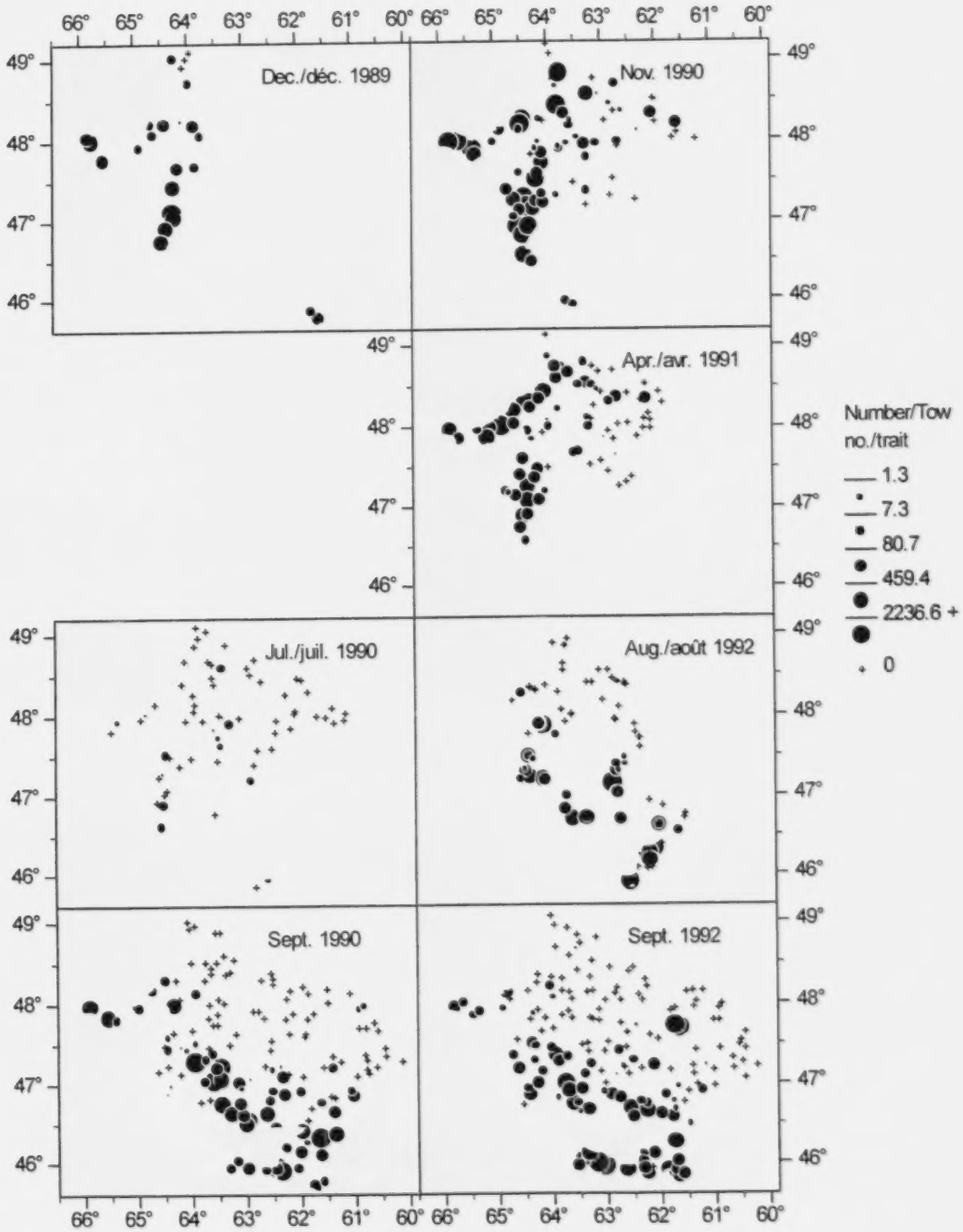

Figure 5d. S.W. Gulf of St. Lawrence seasonal distribution of catches (#/tow) of Atlantic Herring, *Clupea harengus*

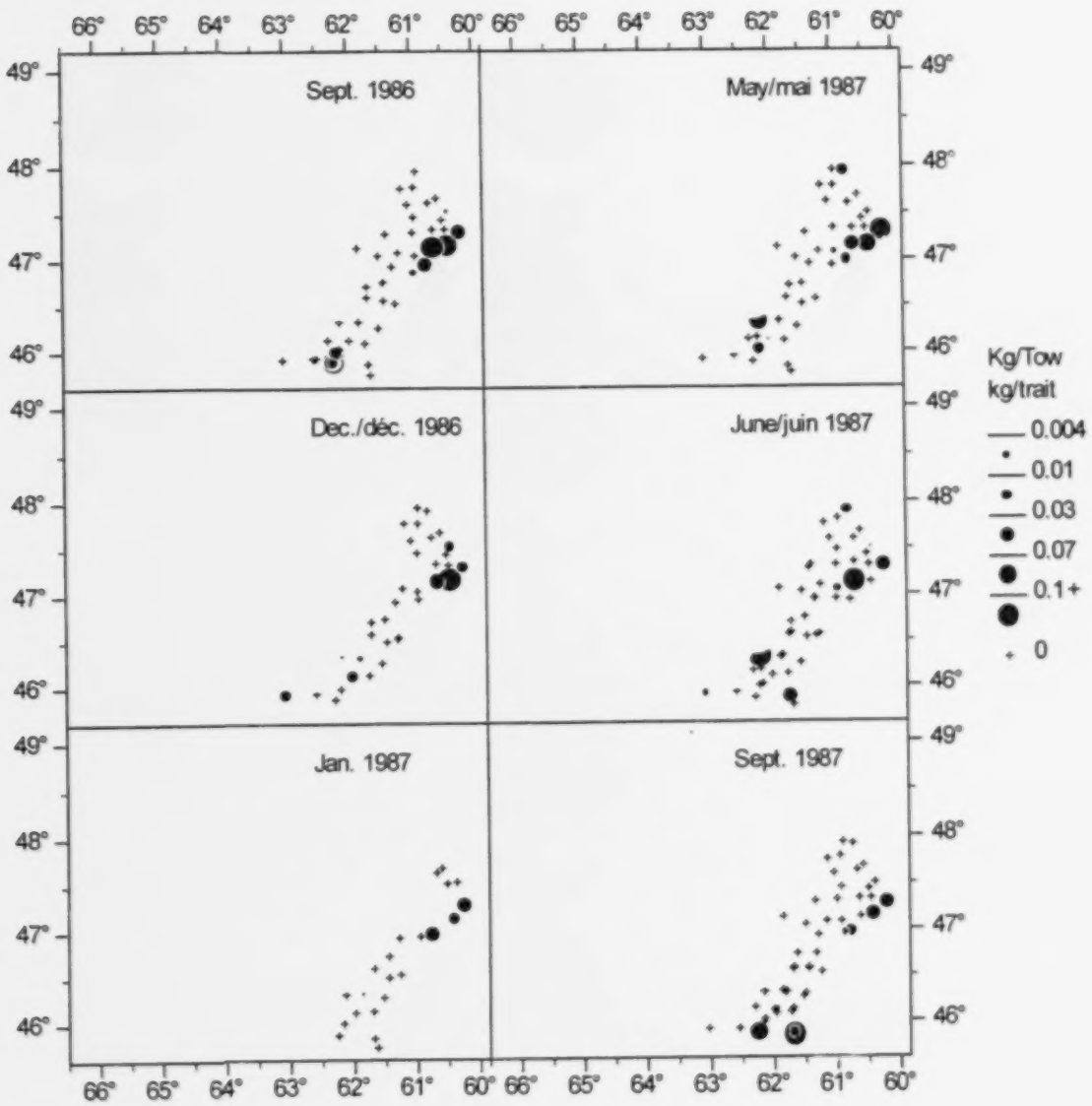

Figure 6a. S.E. Gulf of St. Lawrence seasonal distribution of catches (kg/tow) of Fourbeard Rockling, *Enchelyopus cimbrius*

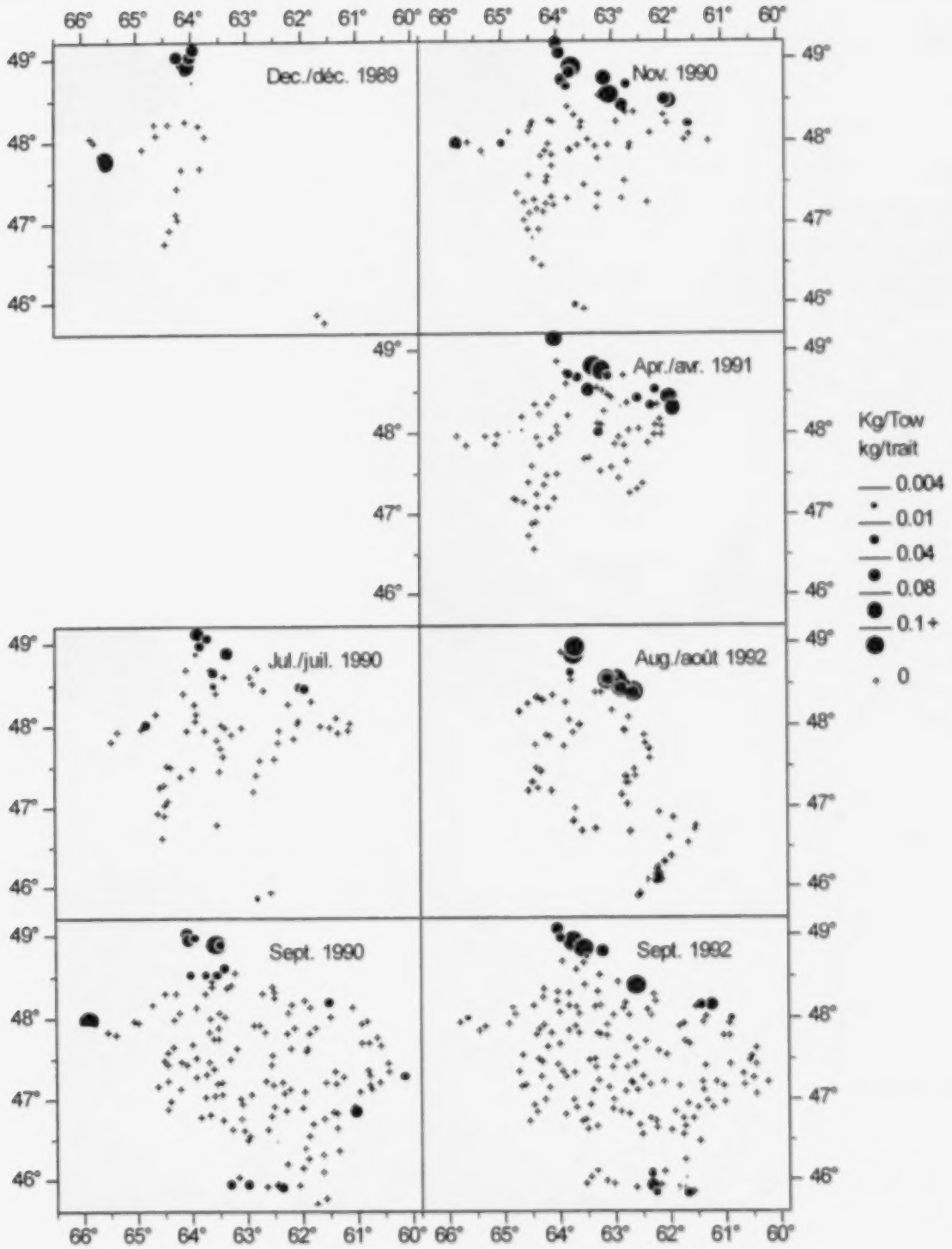

Figure 6b. S.W. Gulf of St. Lawrence seasonal distribution of catches (kg/tow) of Fourbeard Rockling, *Enchelyopus cimbrius*

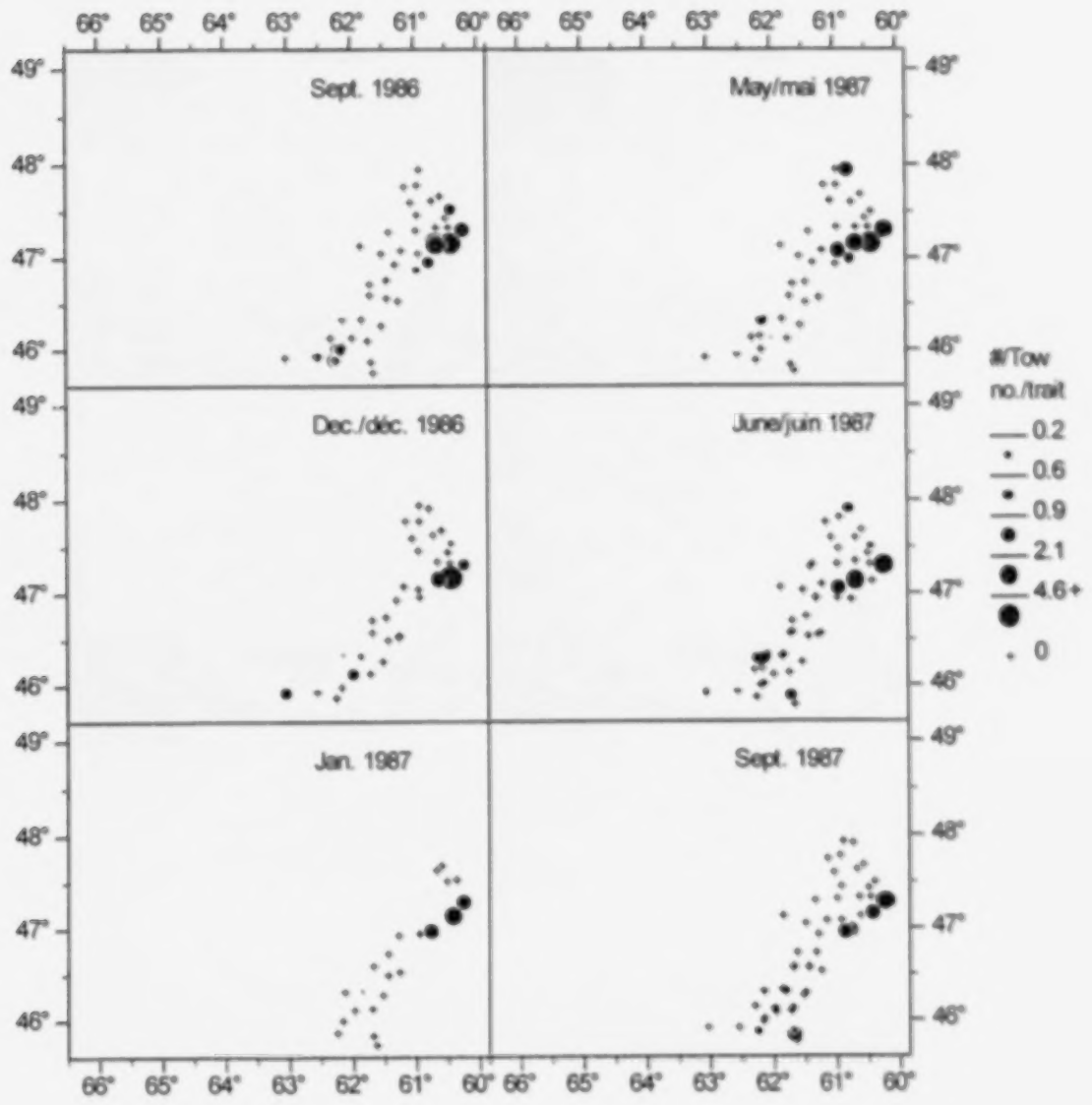

Figure 6c. S.E. Gulf of St. Lawrence seasonal distribution of catches (#/tow) of Fourbeard Rockling, *Enchelyopus cimbrius*

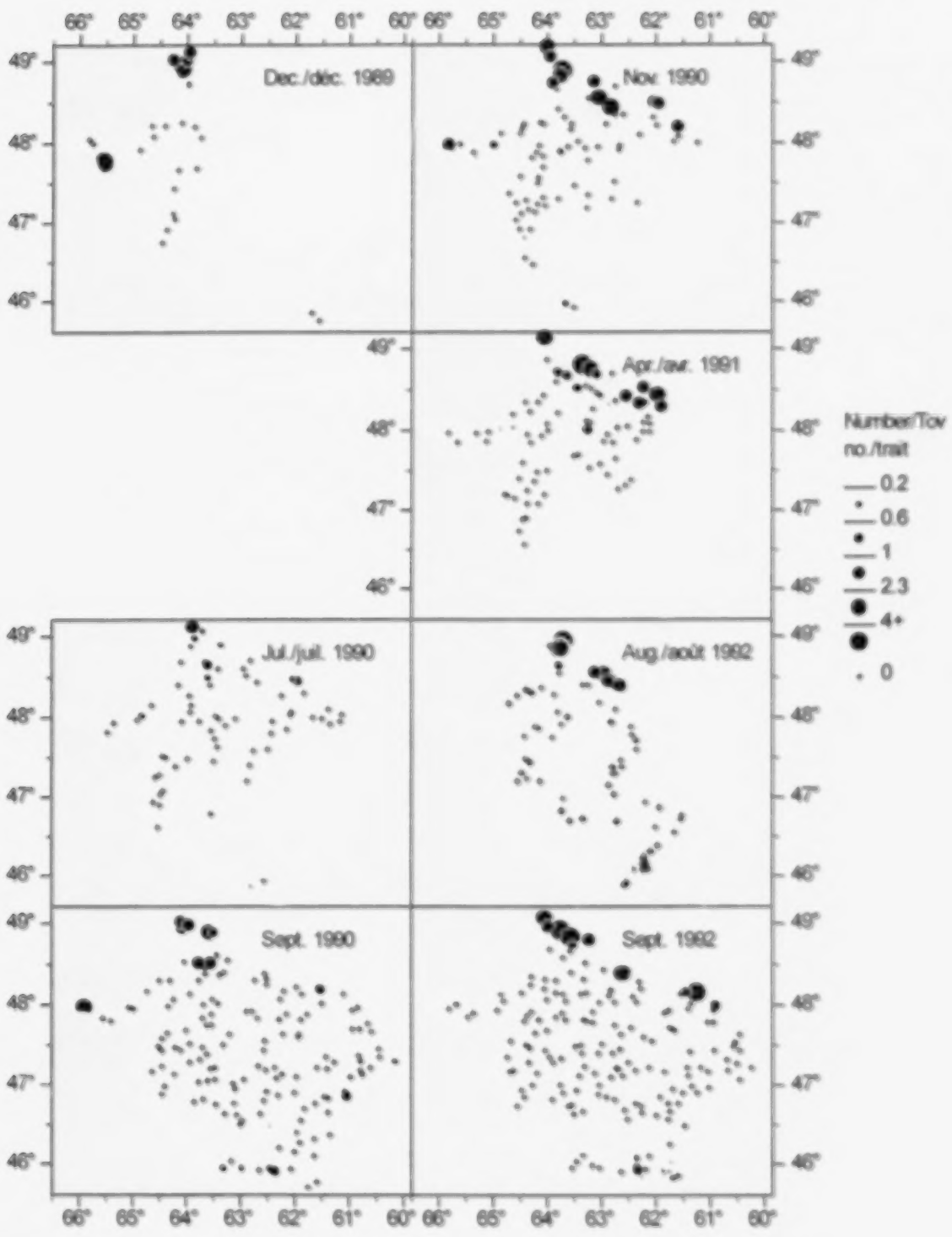

Figure 6d. S.W. Gulf of St. Lawrence seasonal distribution of catches (#/tow) of Fourbeard Rockling, *Enchelyopus cimbrius*

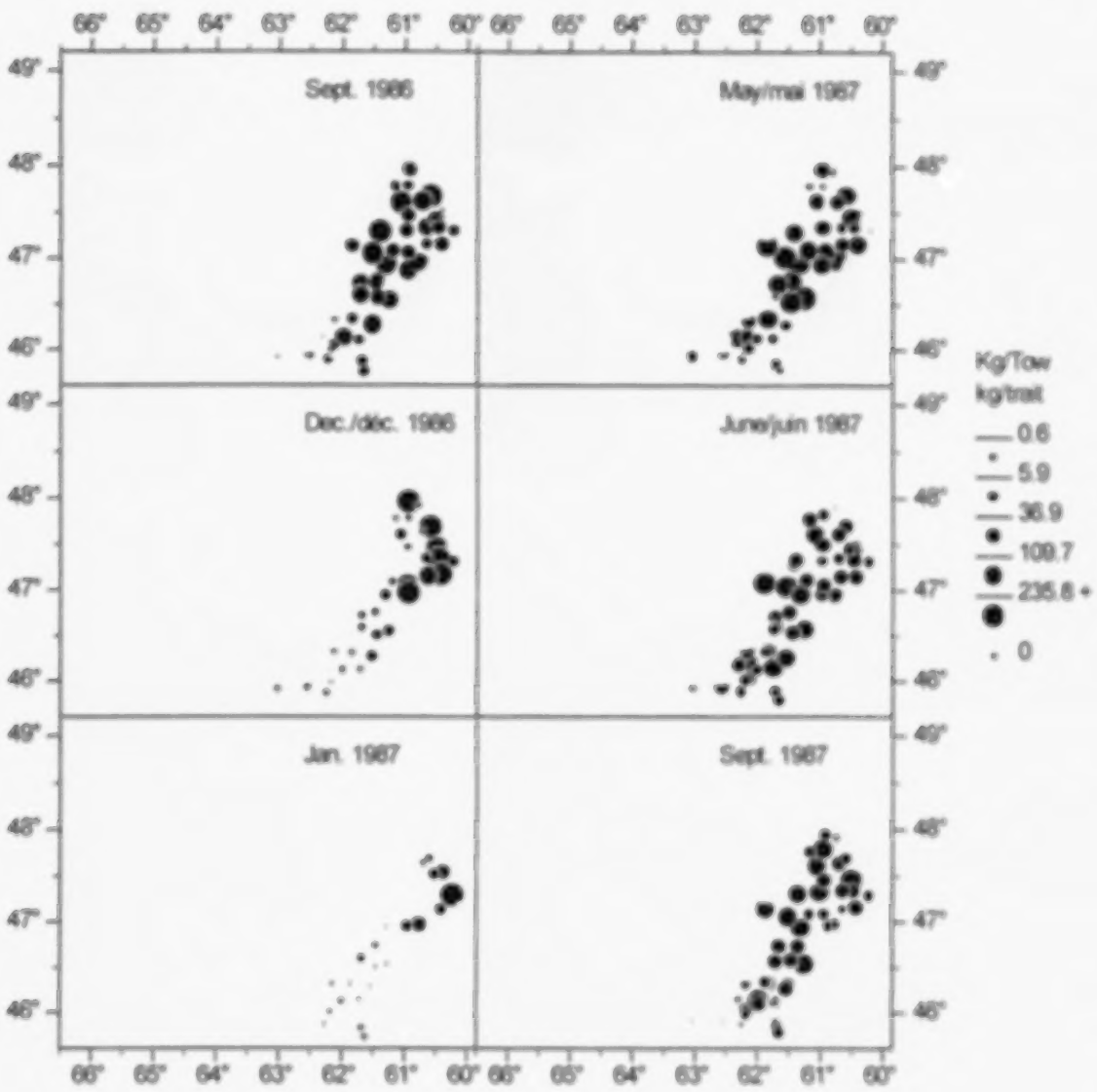

Figure 7a. S.E. Gulf of St. Lawrence seasonal distribution of catches (kg/tow) of Atlantic Cod, *Gadus morhua*

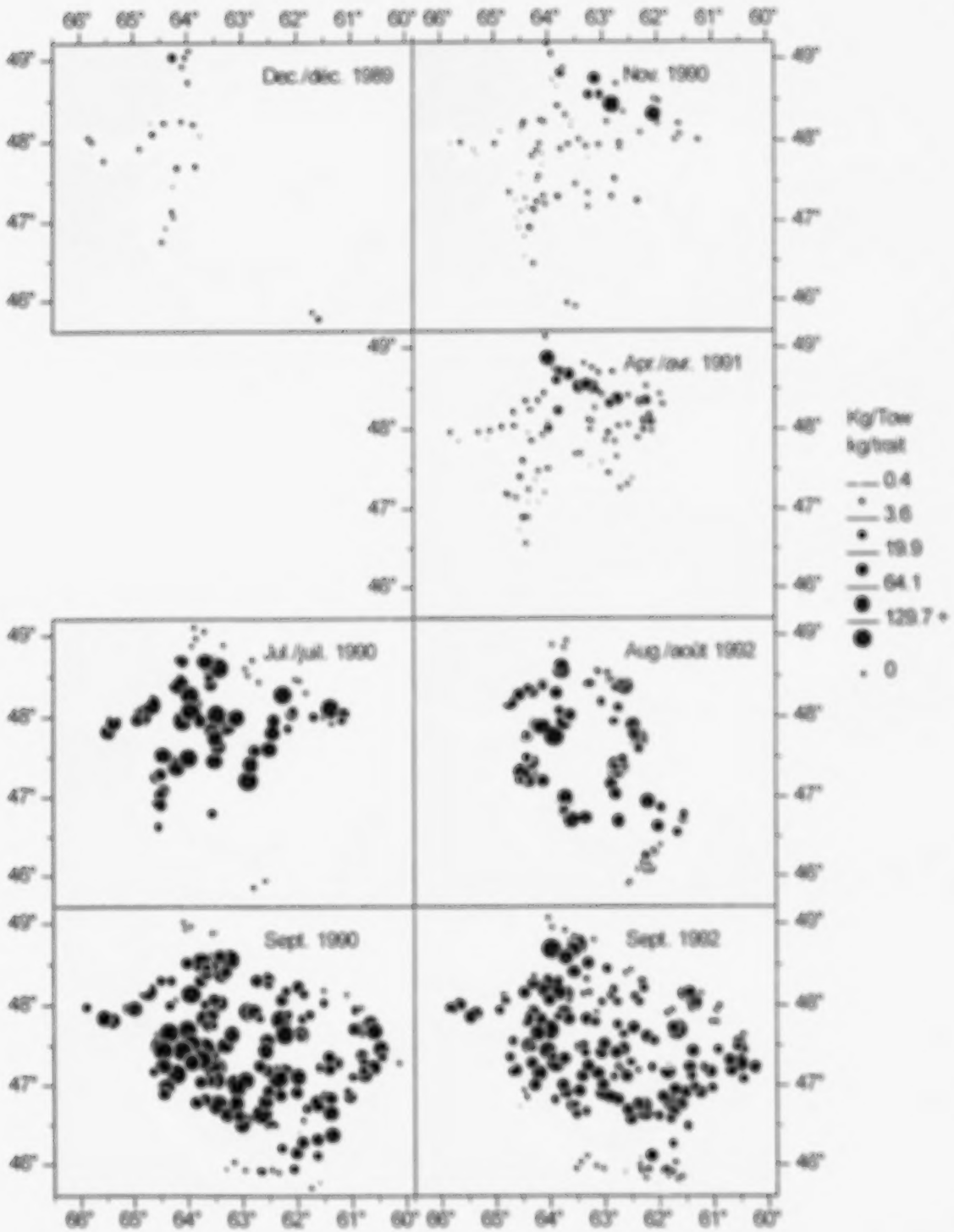

Figure 7b. S.W. Gulf of St. Lawrence seasonal distribution of catches (kg/tow) of Atlantic Cod, *Gadus morhua*

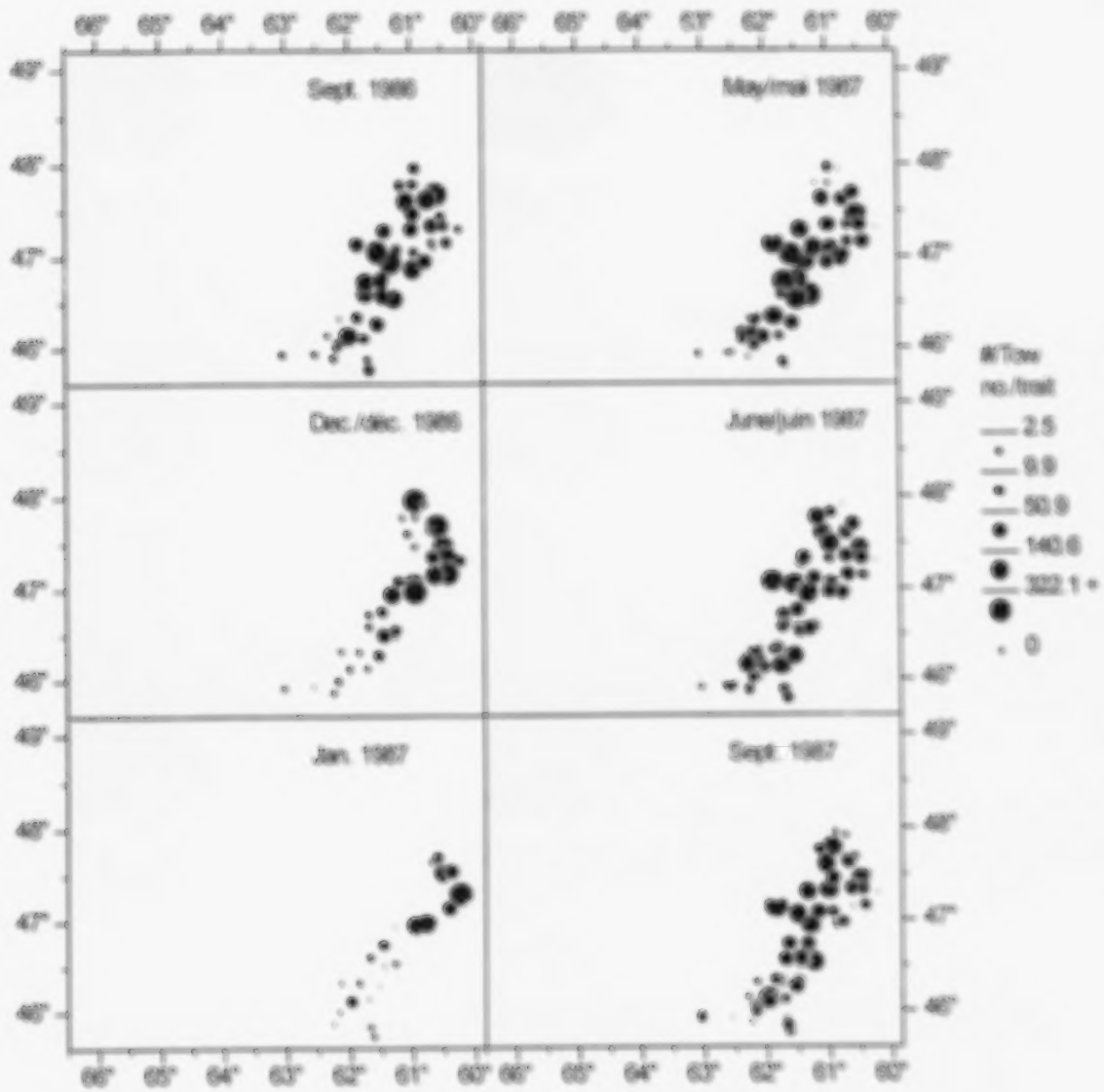

Figure 7c. S.E. Gulf of St. Lawrence seasonal distribution of catches (#/tow) of Atlantic Cod, *Gadus morhua*

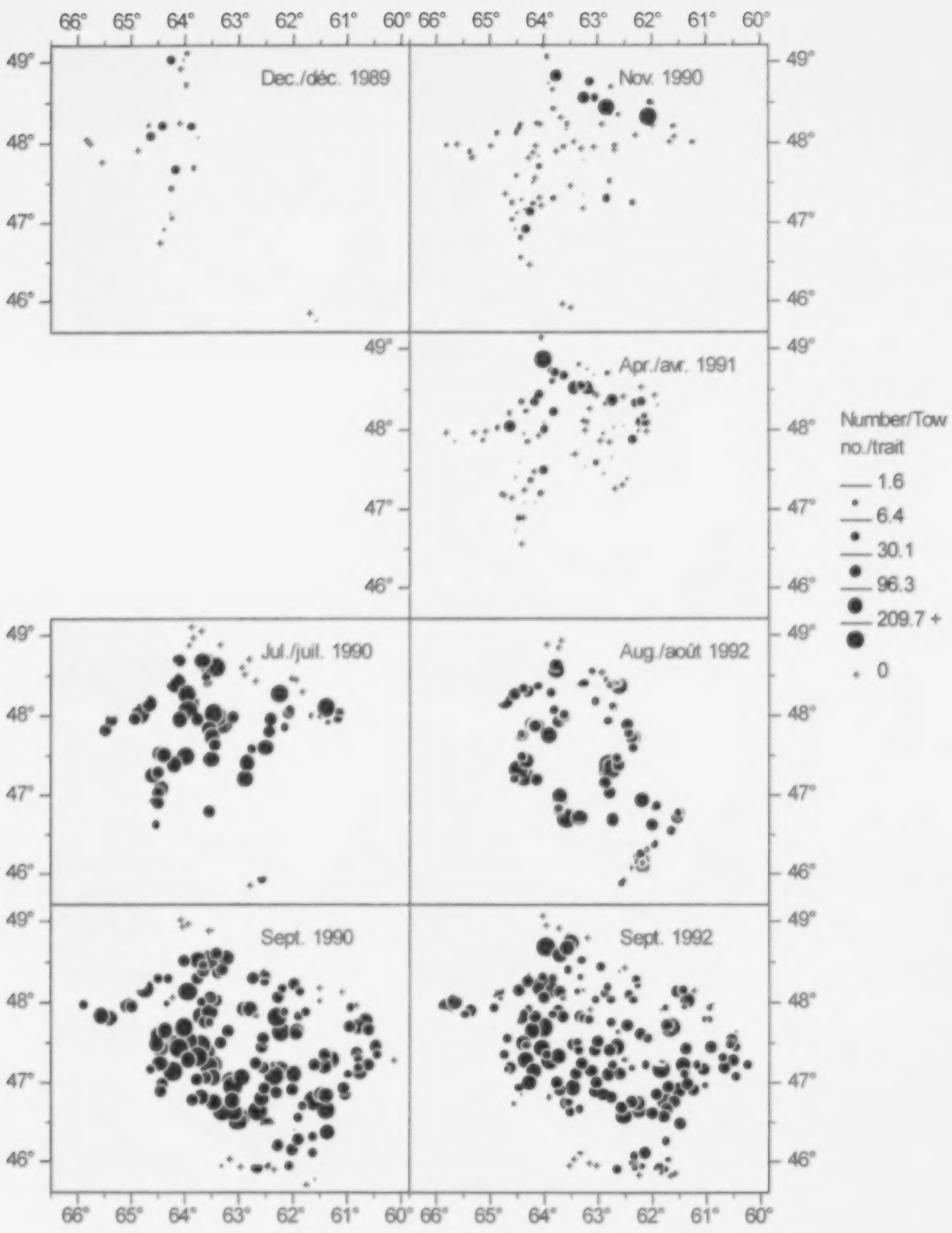

Figure 7d. S.W. Gulf of St. Lawrence seasonal distribution of catches (#/tow) of Atlantic Cod, *Gadus morhua*

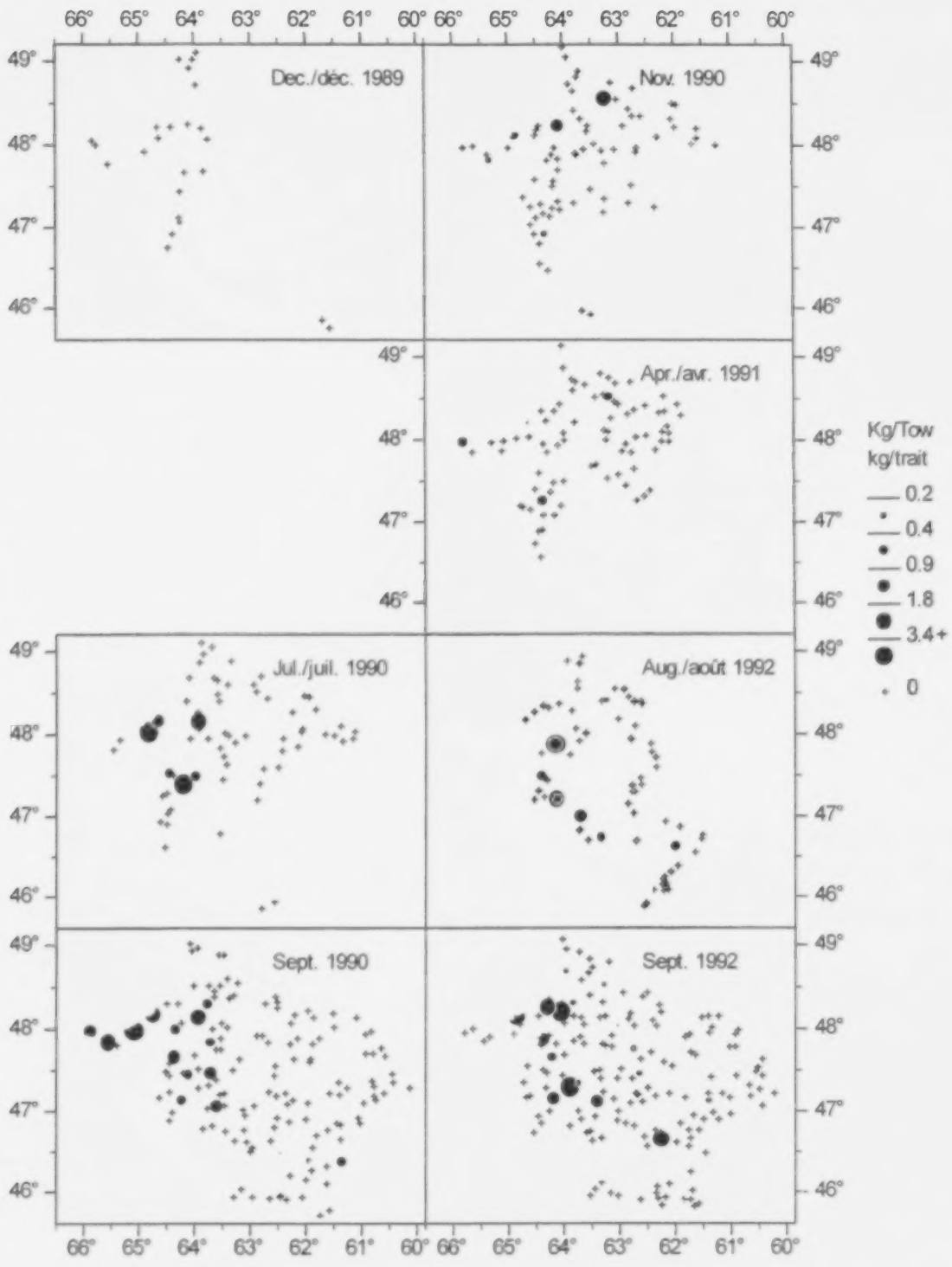

Figure 8a. S.W. Gulf of St. Lawrence seasonal distribution of catches (kg/tow) of Greendland Cod, *Gadus ogac*

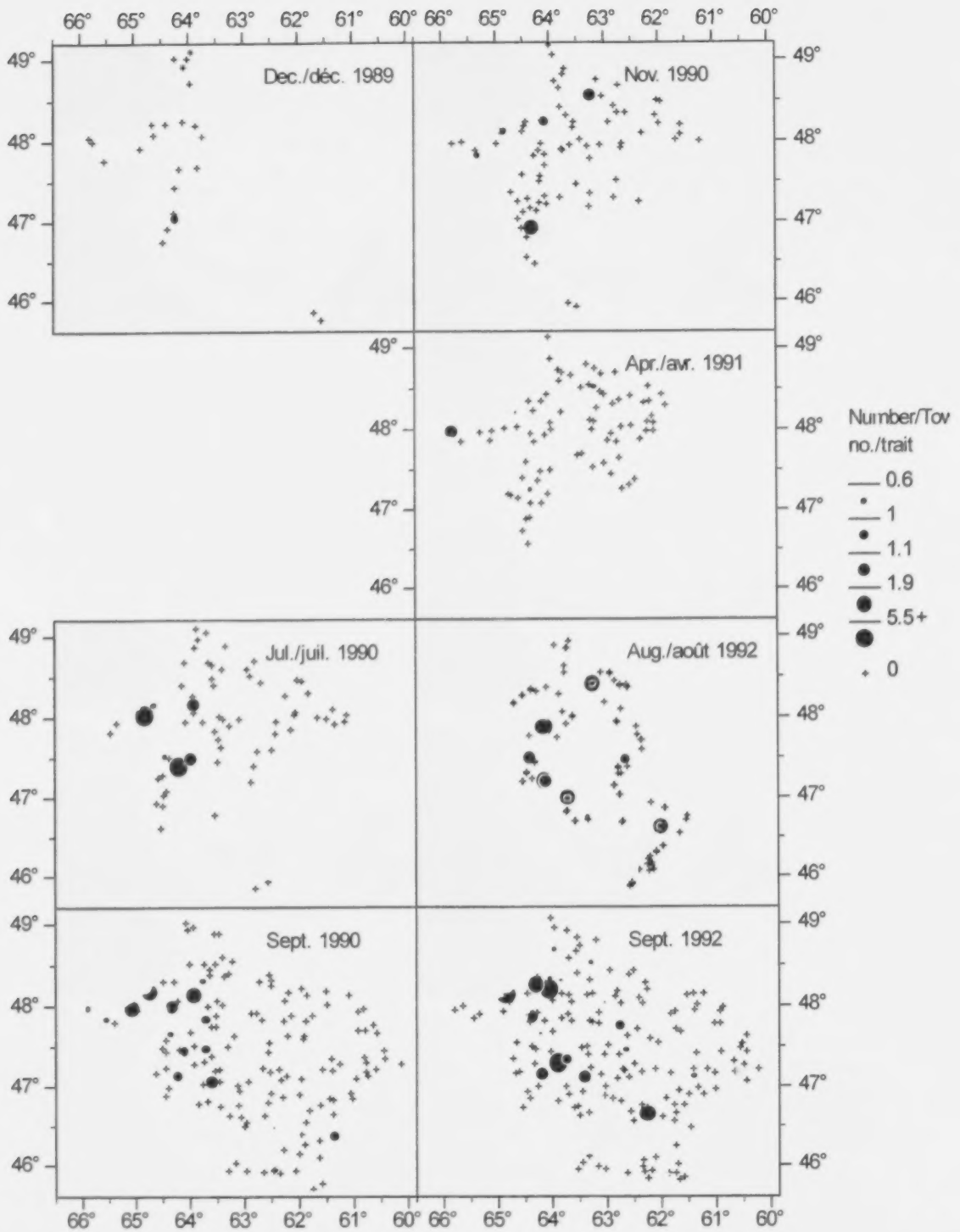

Figure 8b. S.W. Gulf of St. Lawrence seasonal distribution of catches (#/tow) of Greendland Cod, *Gadus ogac*

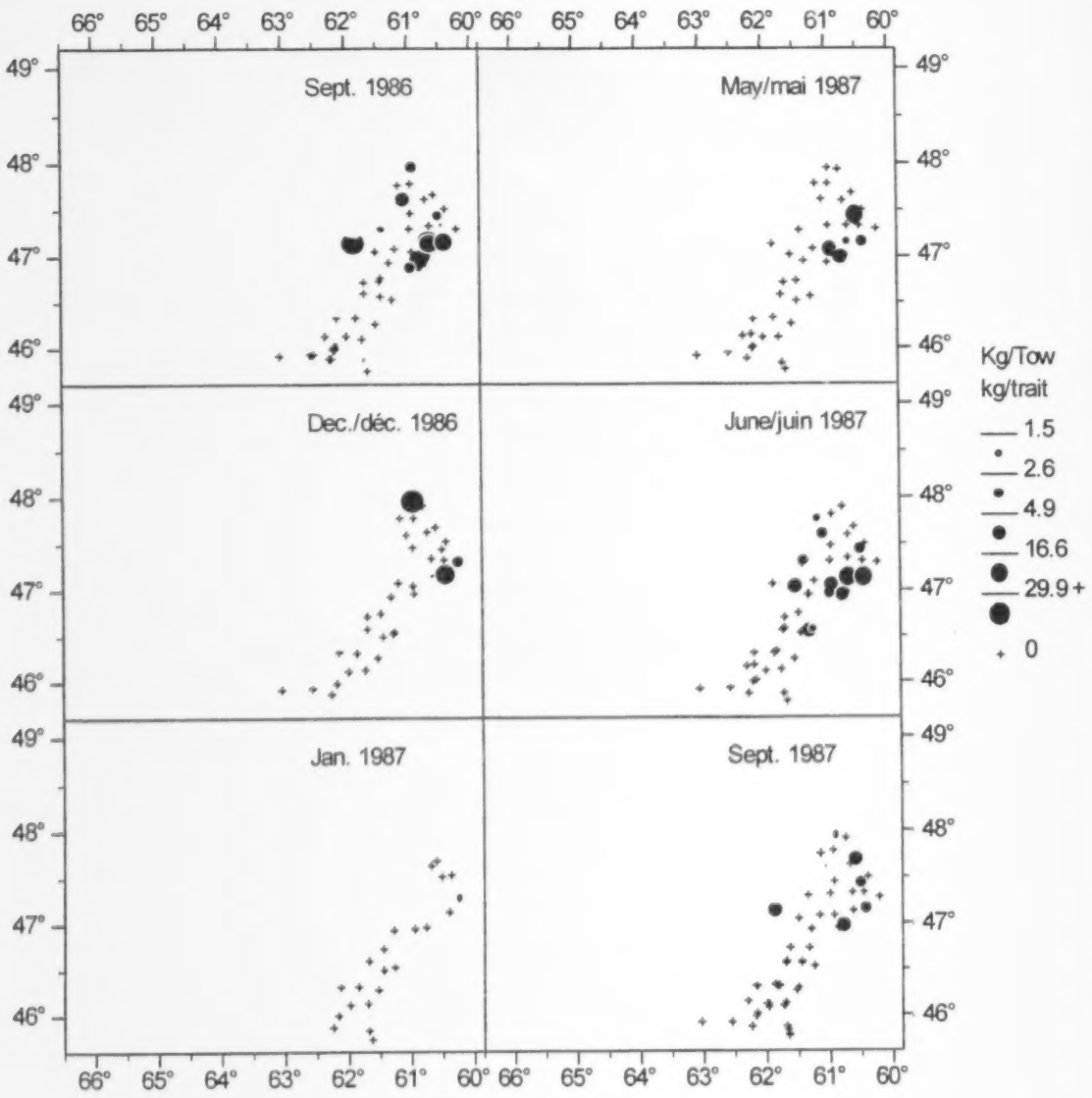

Figure 9a. S.E. Gulf of St. Lawrence seasonal distribution of catches (kg/tow) of Haddock, *Melanogrammus aeglefinus*

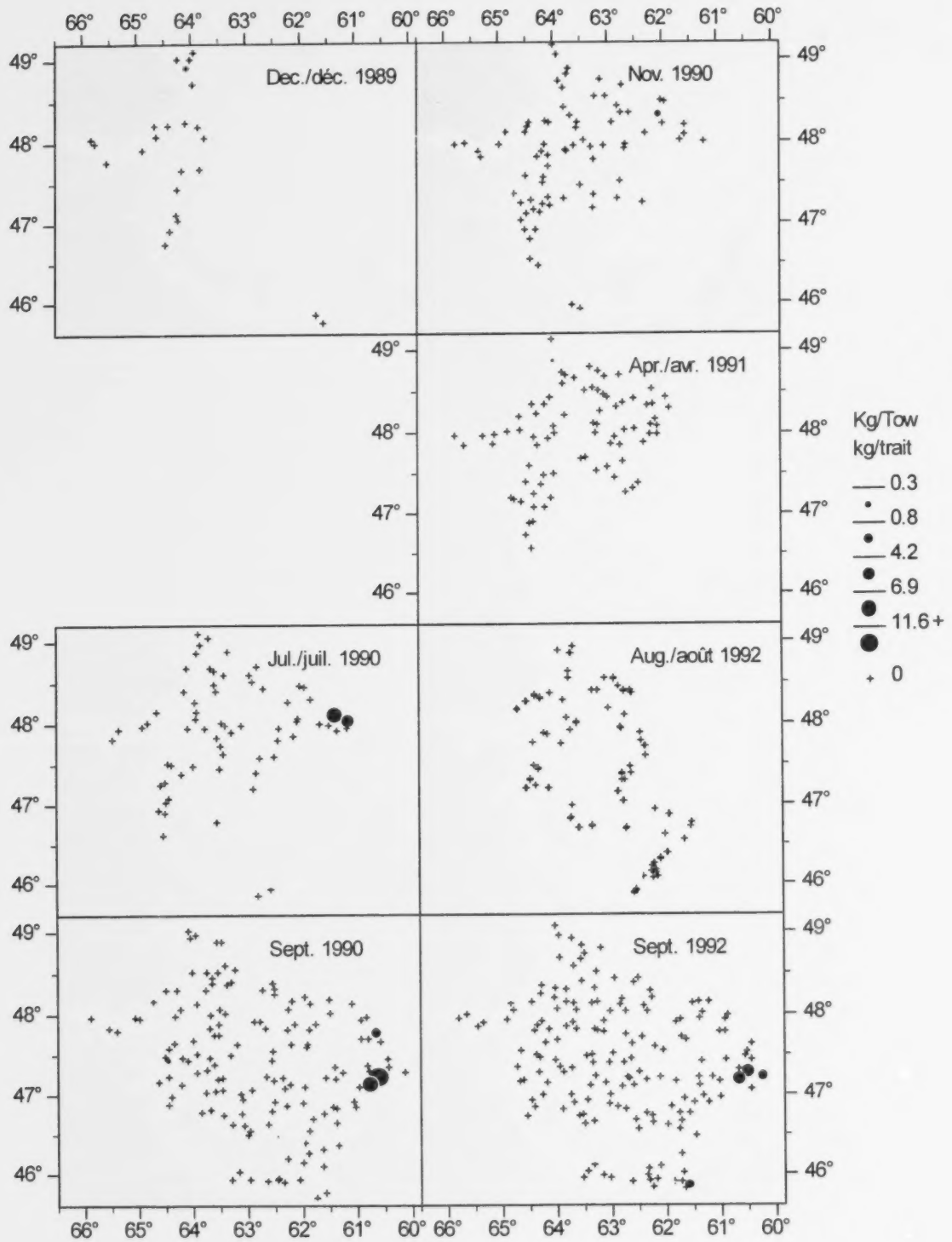

Figure 9b. S.W. Gulf of St. Lawrence seasonal distribution of catches (kg/tow) of Haddock, *Melanogrammus aeglefinus*

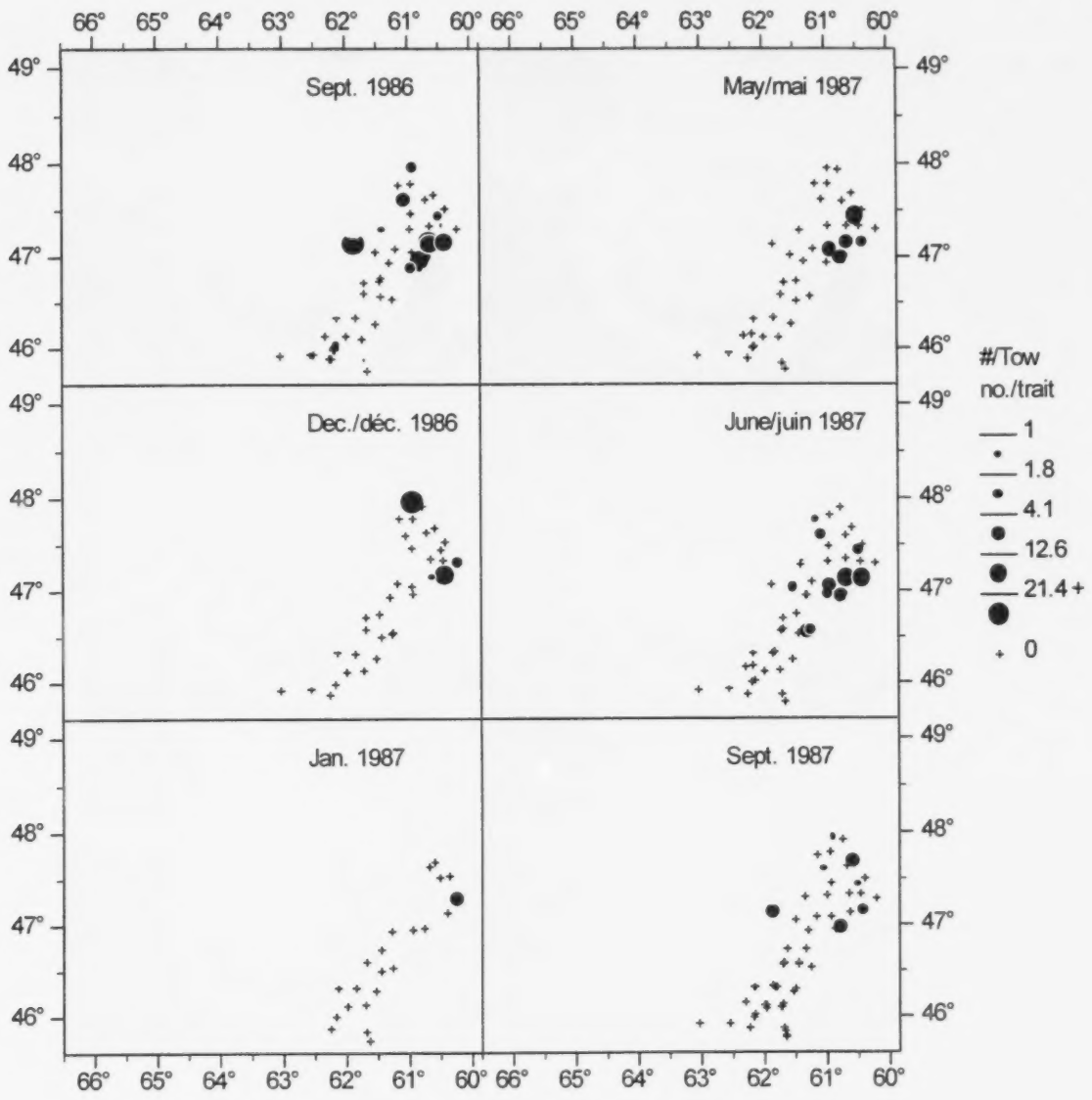

Figure 9c. S.E. Gulf of St. Lawrence seasonal distribution of catches (#/tow) of Haddock, *Melanogrammus aeglefinus*

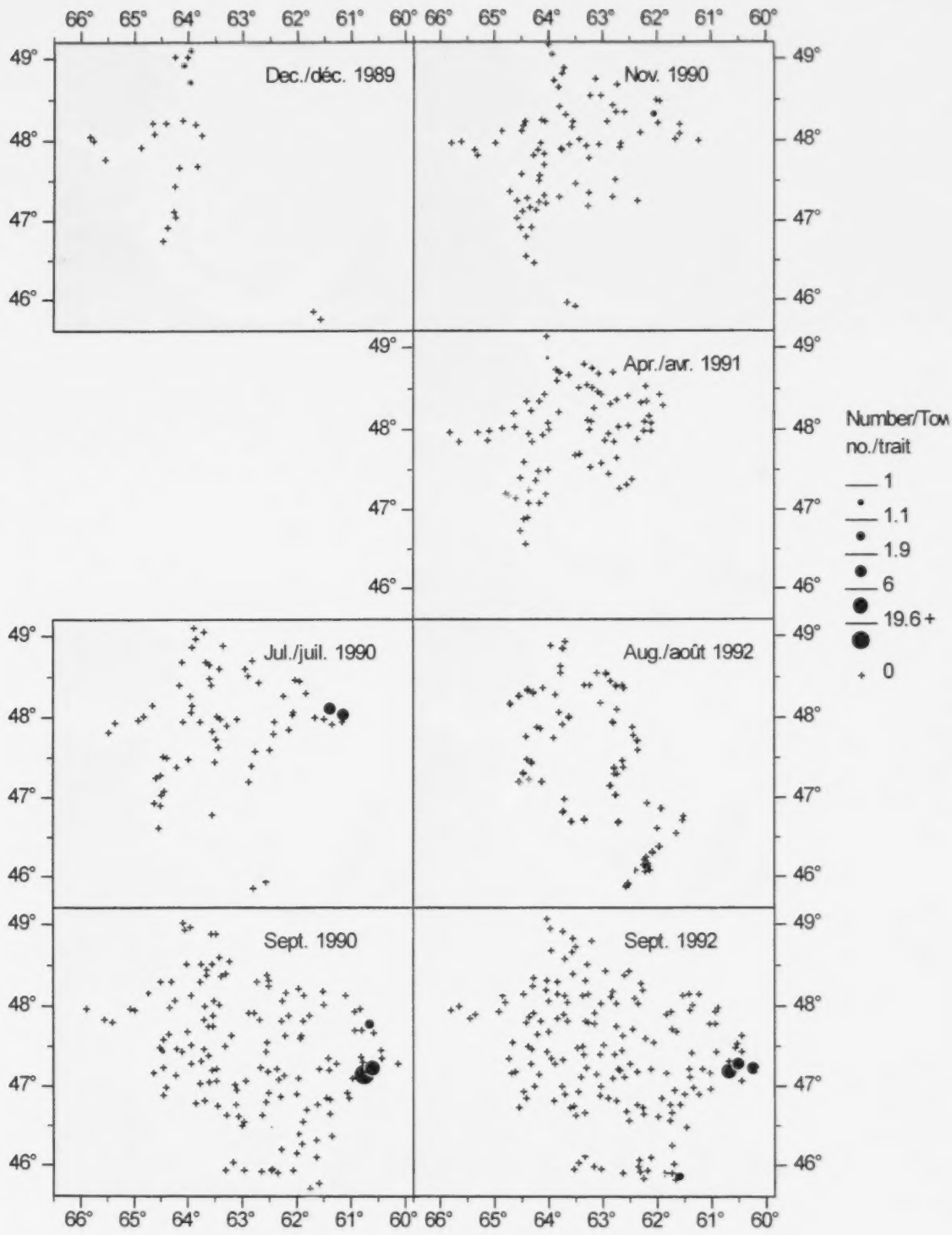

Figure 9d. S.W. Gulf of St. Lawrence seasonal distribution of catches (#/tow) of Haddock, *Melanogrammus aeglefinus*

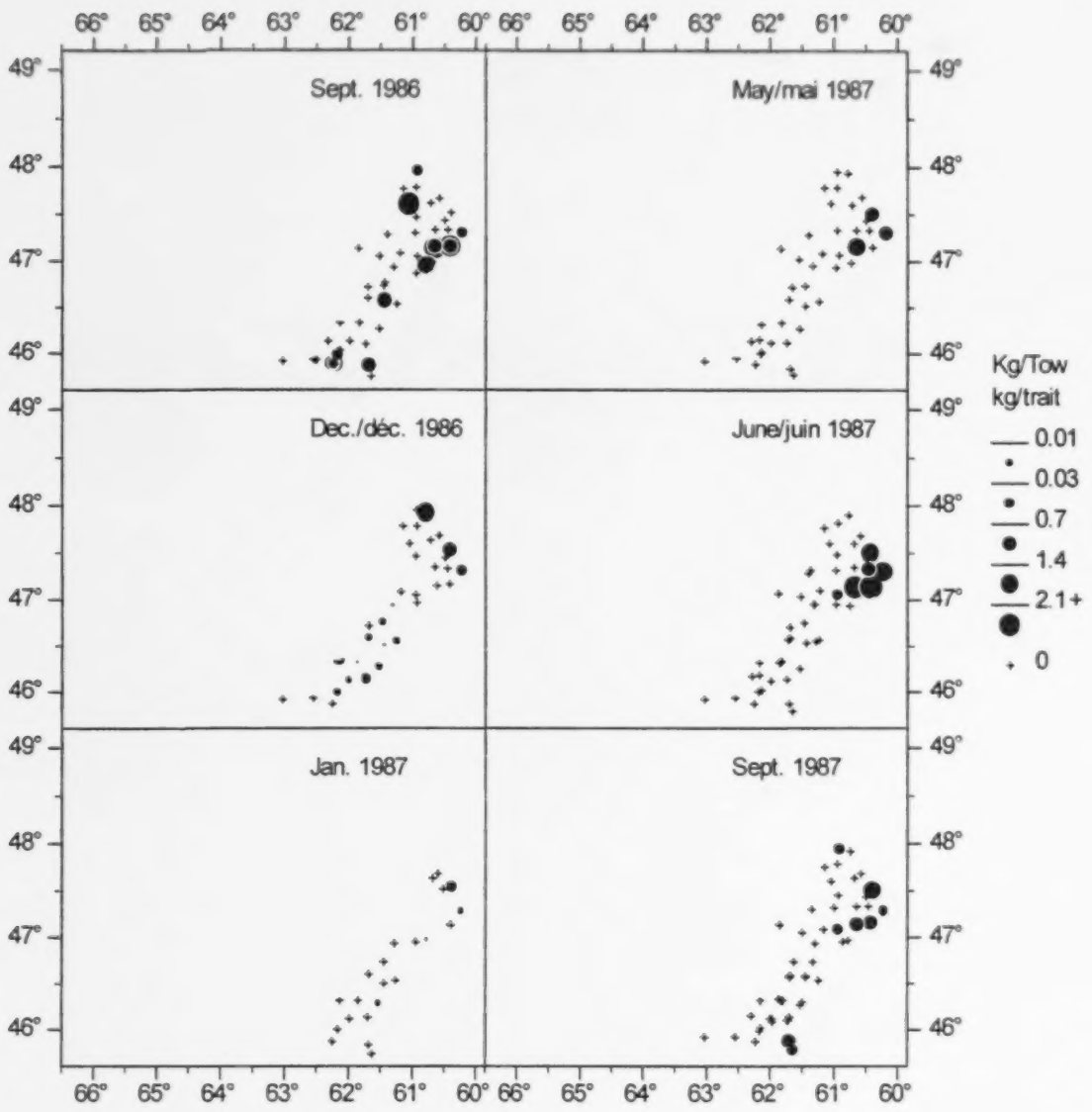

Figure 10a. S.E. Gulf of St. Lawrence seasonal distribution of catches (kg/tow) of Silver Hake, *Merluccius bilinearis*

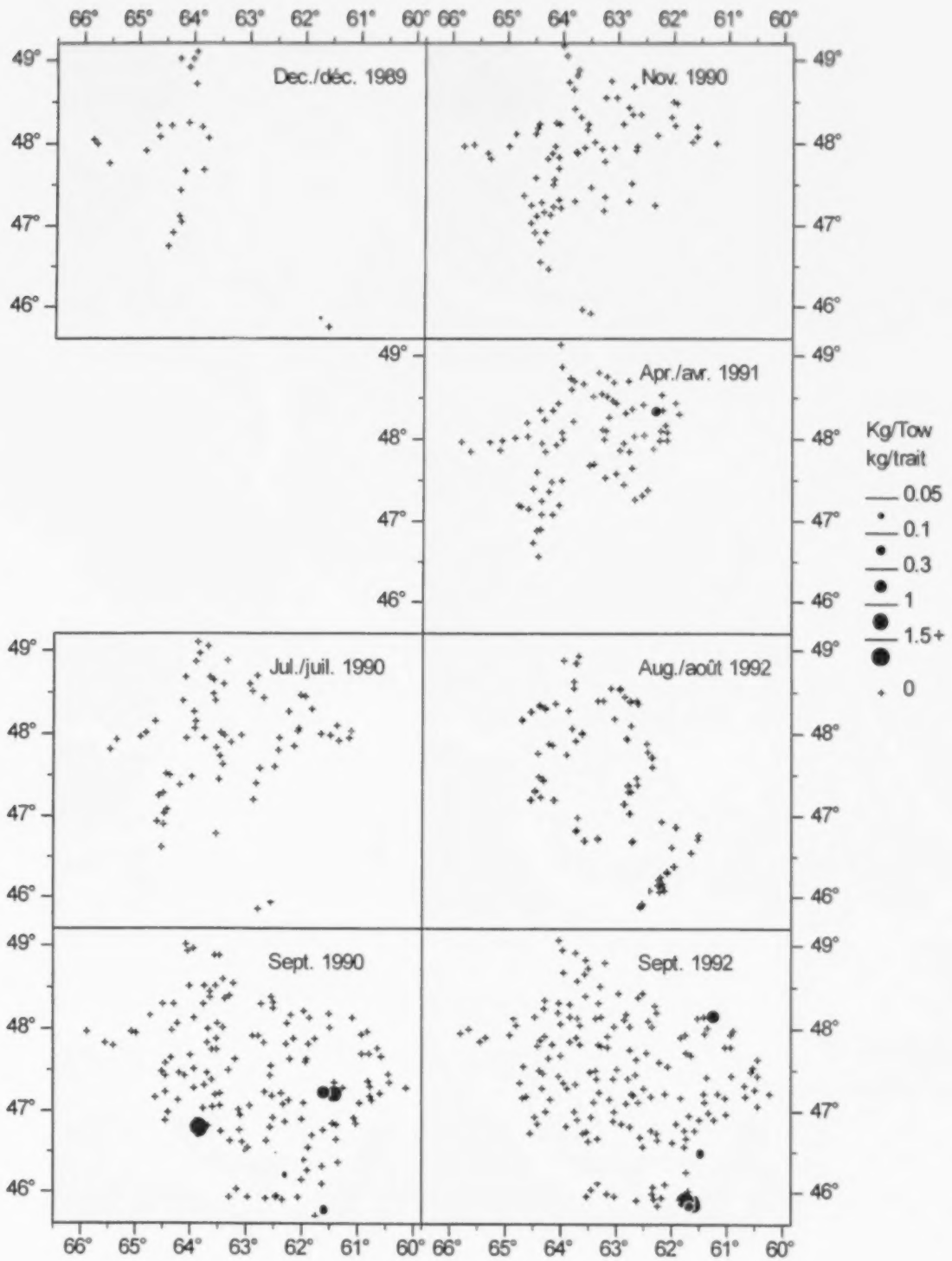

Figure 10b. S.W. Gulf of St. Lawrence seasonal distribution of catches (kg/tow) of Silver Hake, *Merluccius bilinearis*

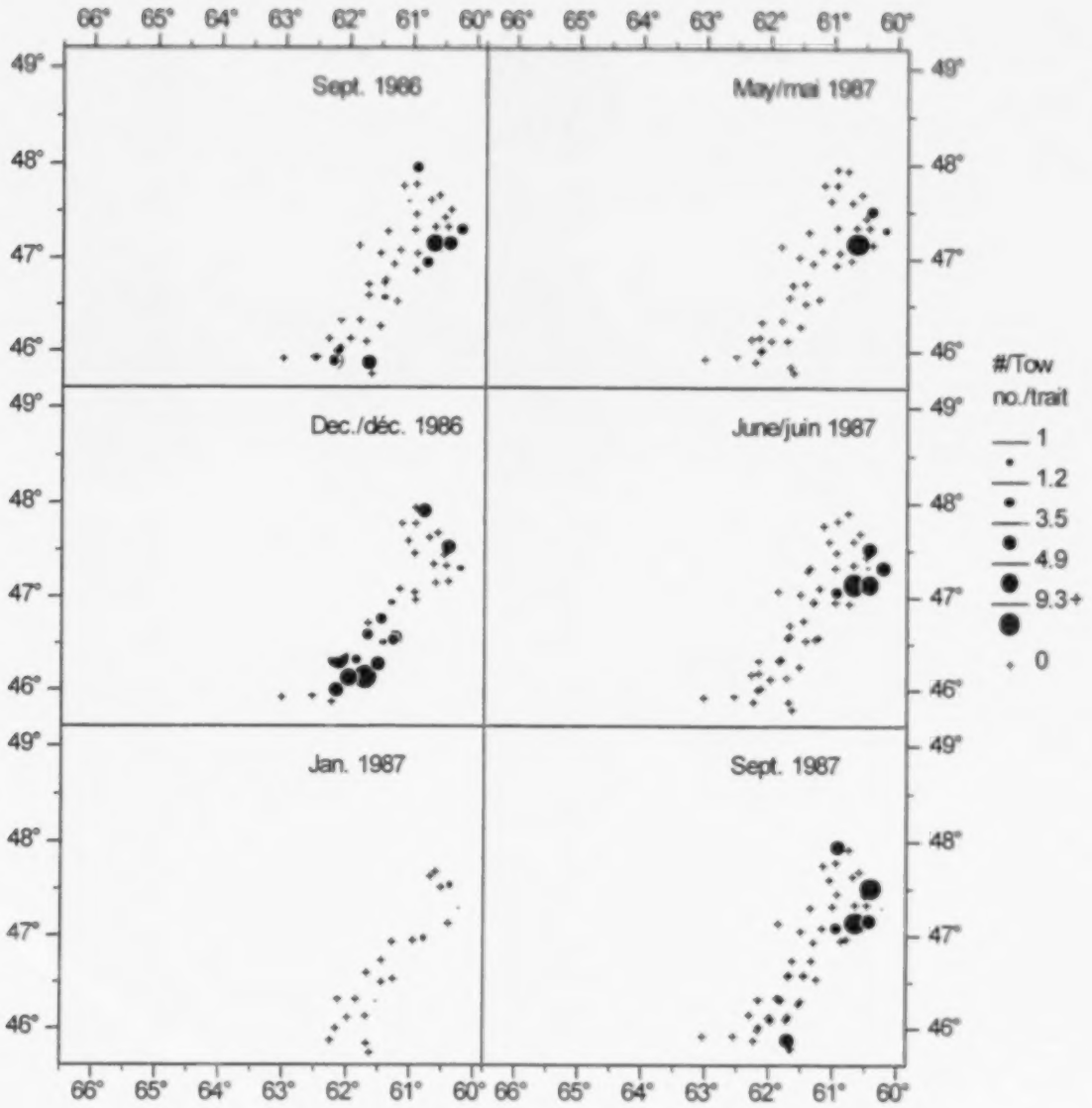

Figure 10c. S.E. Gulf of St. Lawrence seasonal distribution of catches (#/tow) of Silver Hake, *Merluccius bilinearis*

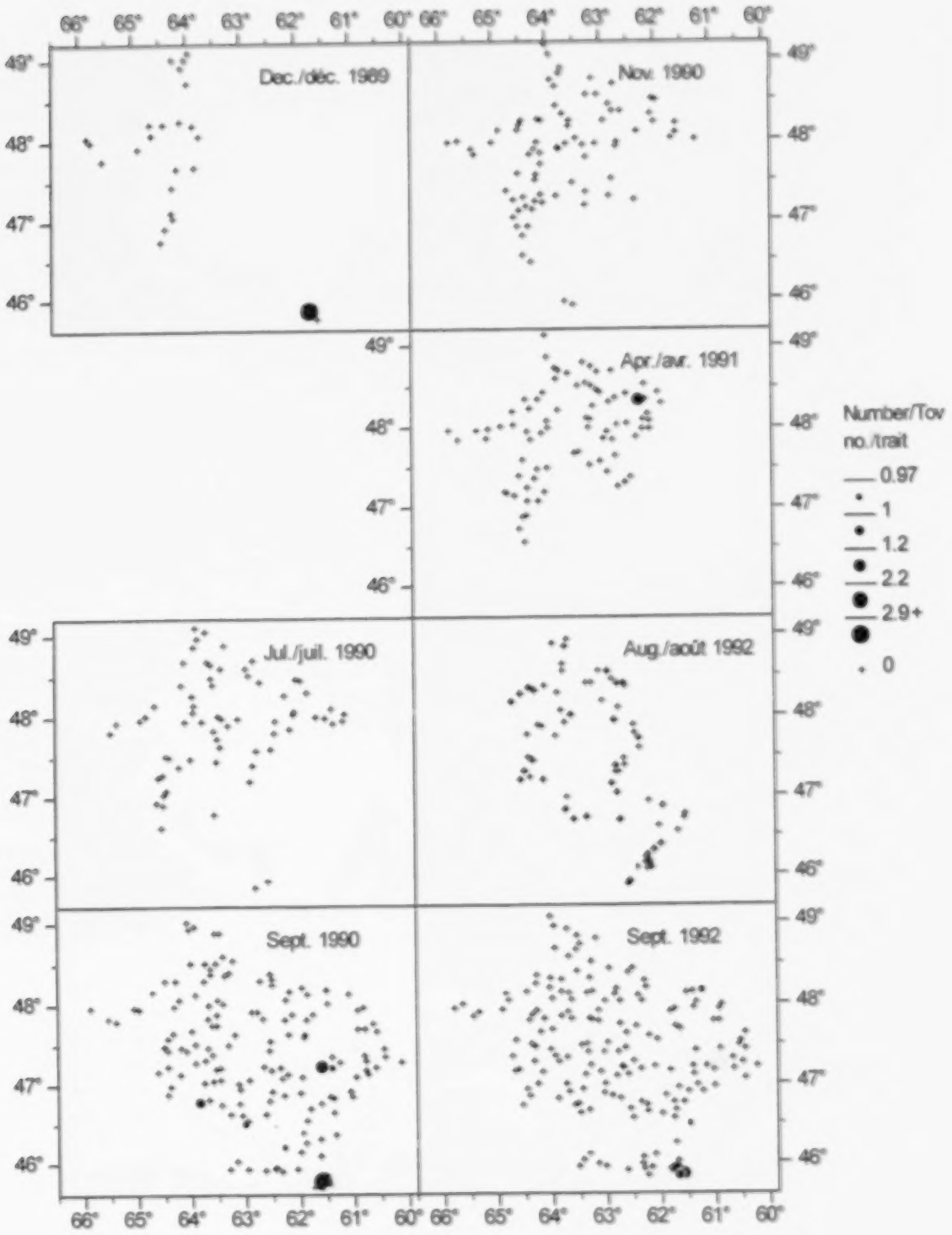

Figure 10d. S.W. Gulf of St. Lawrence seasonal distribution of catches (#/tow) of Silver Hake, *Merluccius bilinearis*

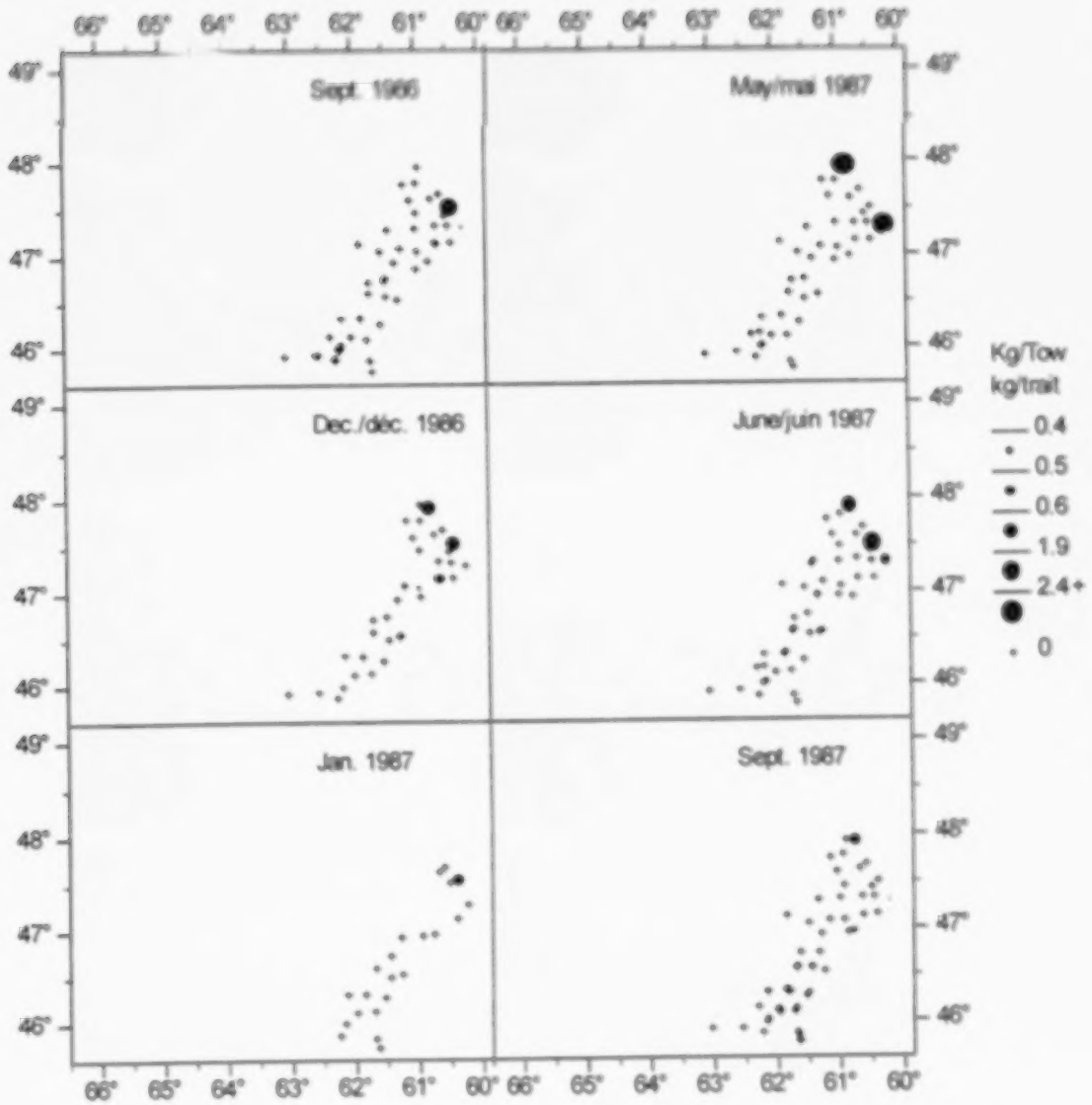

Figure 11a. S.E. Gulf of St. Lawrence seasonal distribution of catches (kg/tow) of Longfin Hake, *Phycis chesteri*

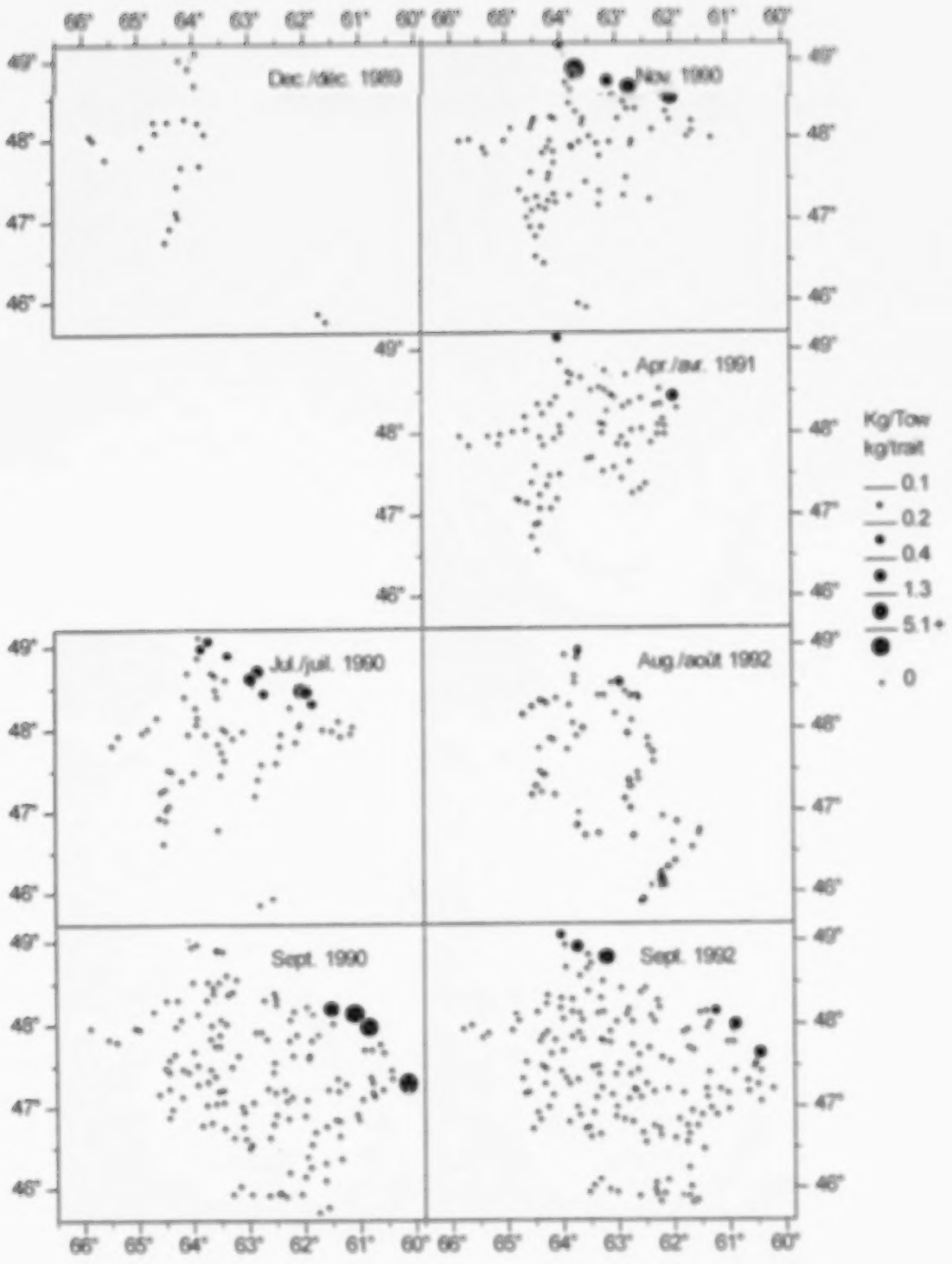

Figure 11b. S.W. Gulf of St. Lawrence seasonal distribution of catches (kg/tow) of Longfin Hake, *Phycis chesteri*

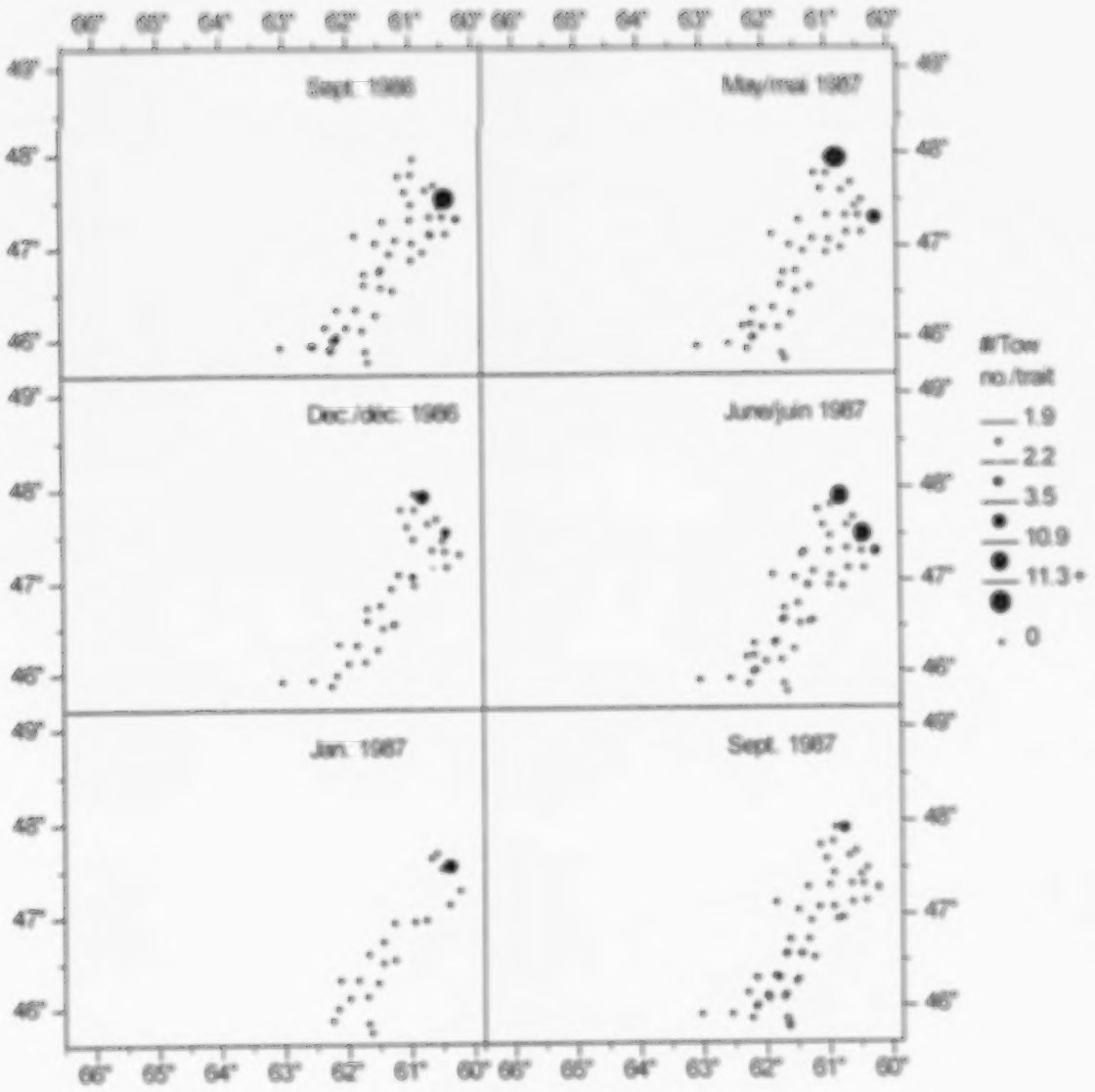

Figure 11c. S.E. Gulf of St. Lawrence seasonal distribution of catches (#/tow) of Longfin Hake, *Phycis chesteri*

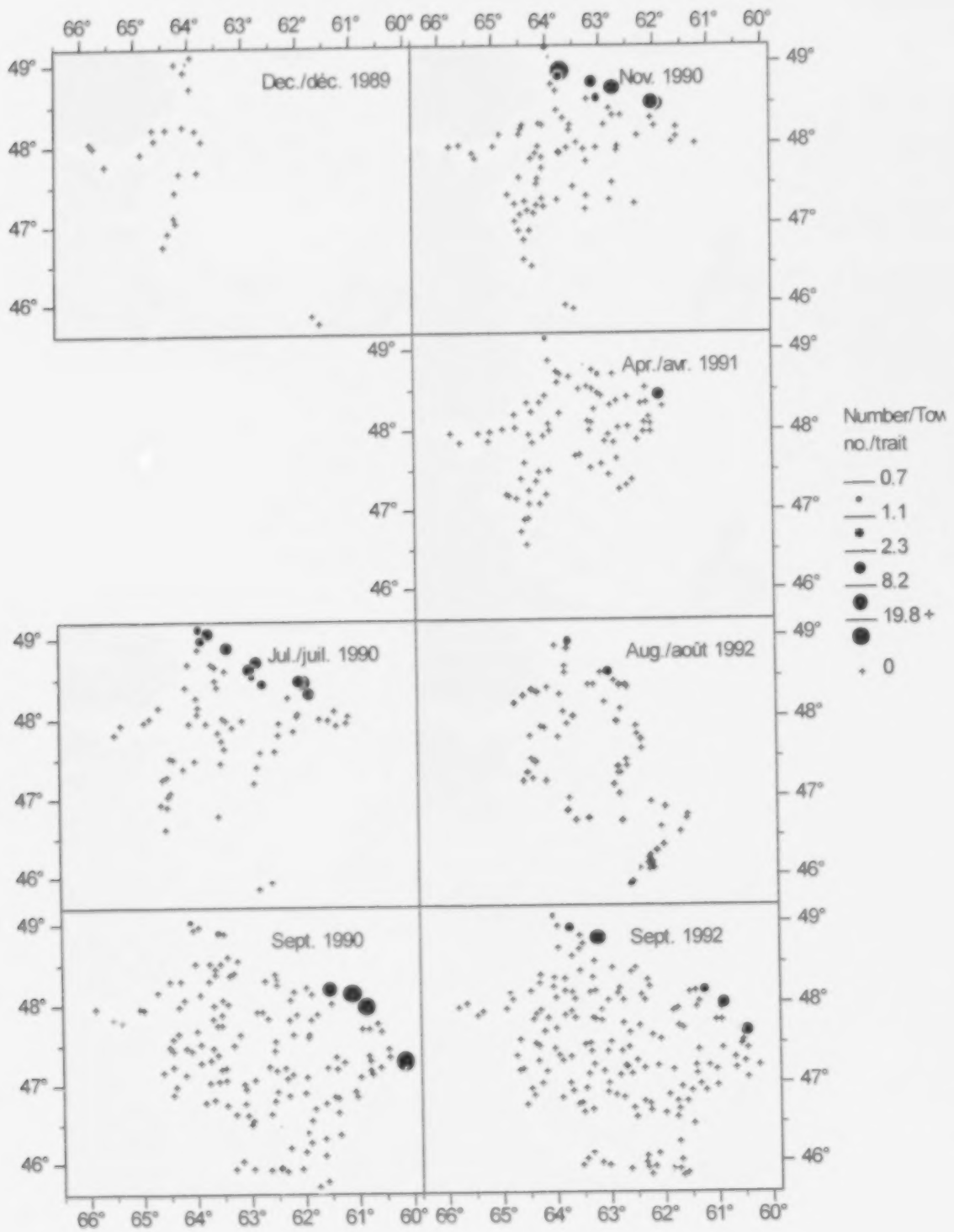

Figure 11d. S.W. Gulf of St. Lawrence seasonal distribution of catches (#/tow) of Longfin Hake, *Phycis chesteri*

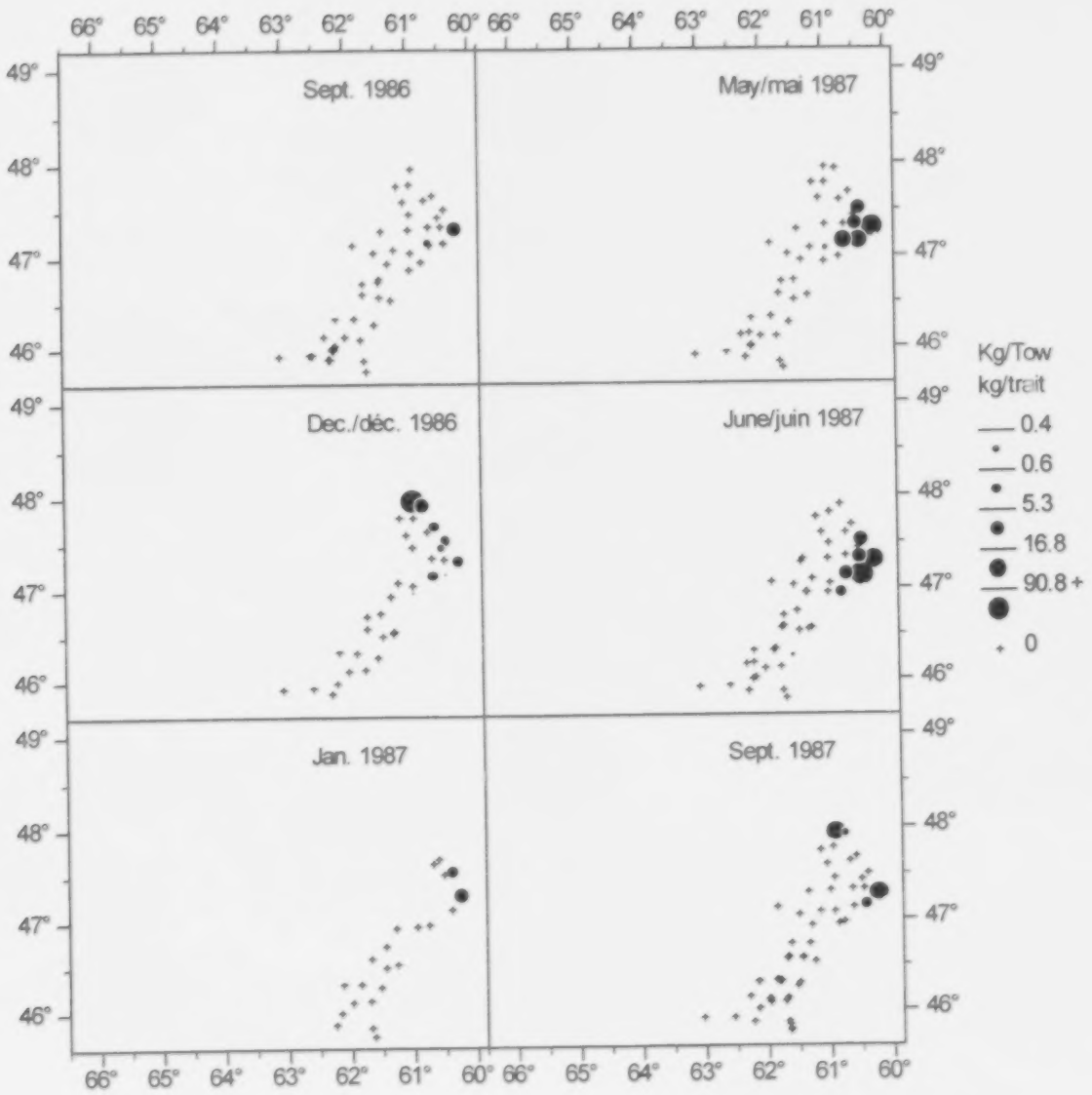

Figure 12a. S.E. Gulf of St. Lawrence seasonal distribution of catches (kg/tow) of Pollock, *Pollachius virens*

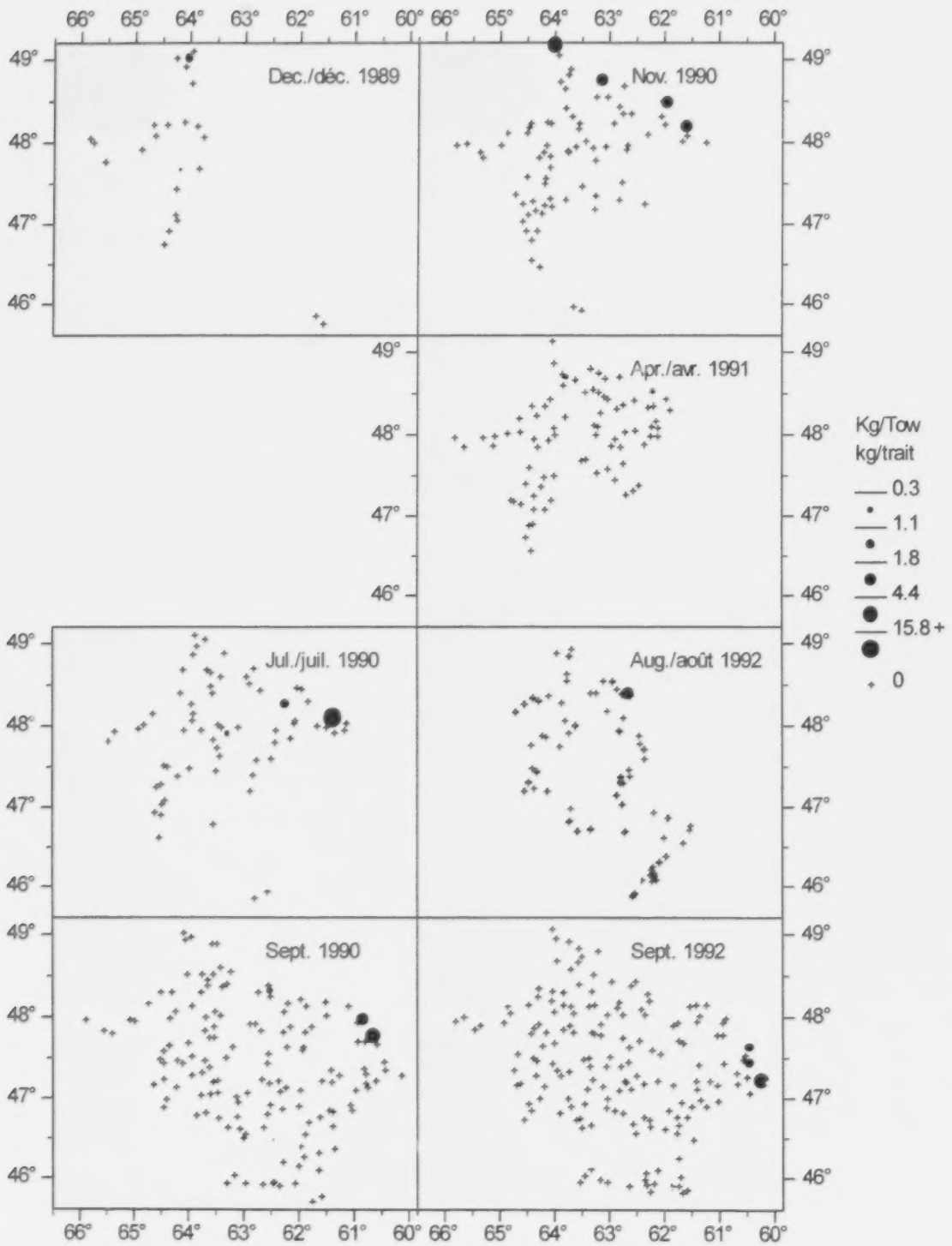

Figure 12b. S.W. Gulf of St. Lawrence seasonal distribution of catches (kg/tow) of Pollock, *Pollachius virens*

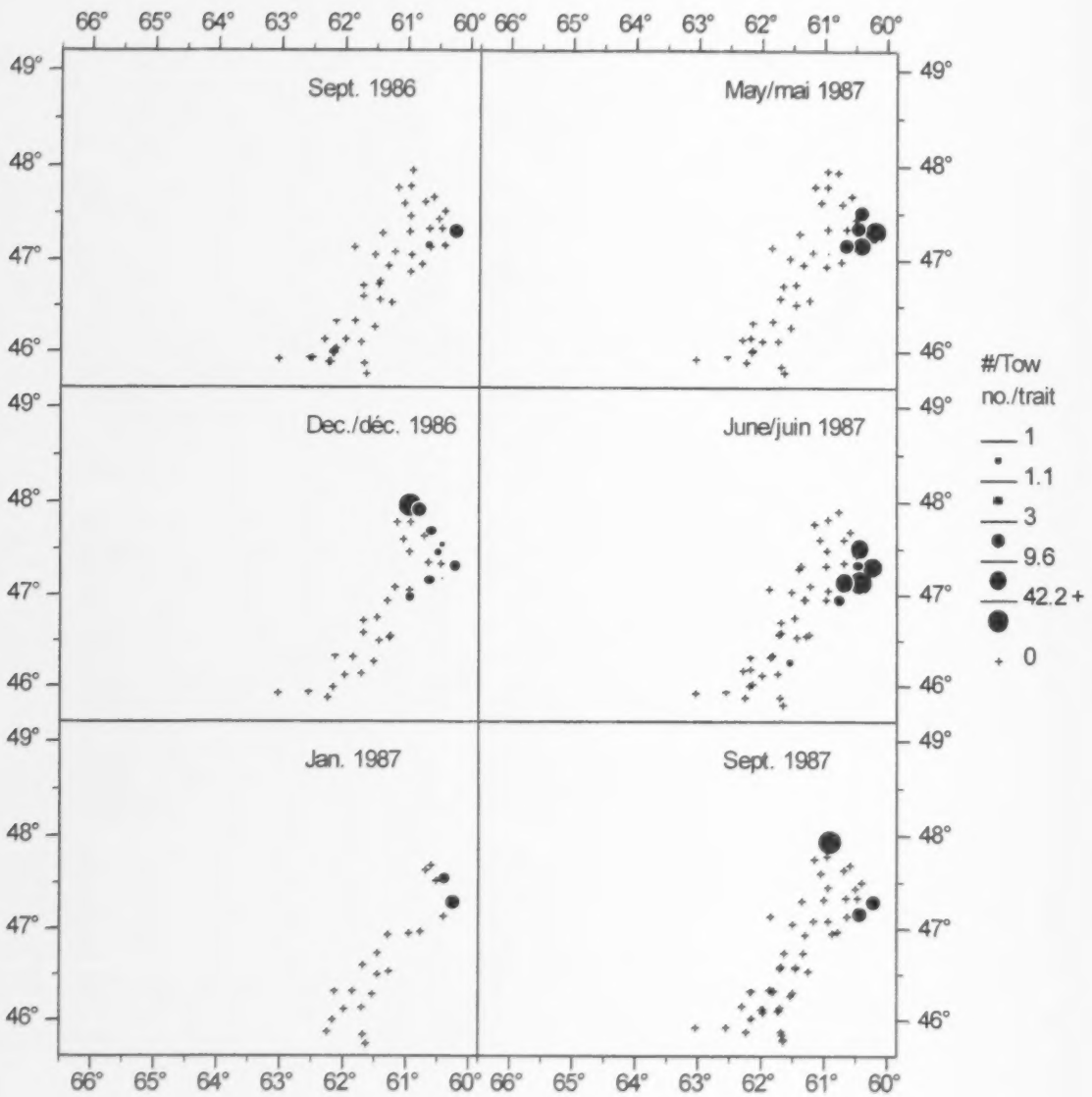

Figure 12c. S.E. Gulf of St. Lawrence seasonal distribution of catches (#/tow) of Pollock, *Pollachius virens*

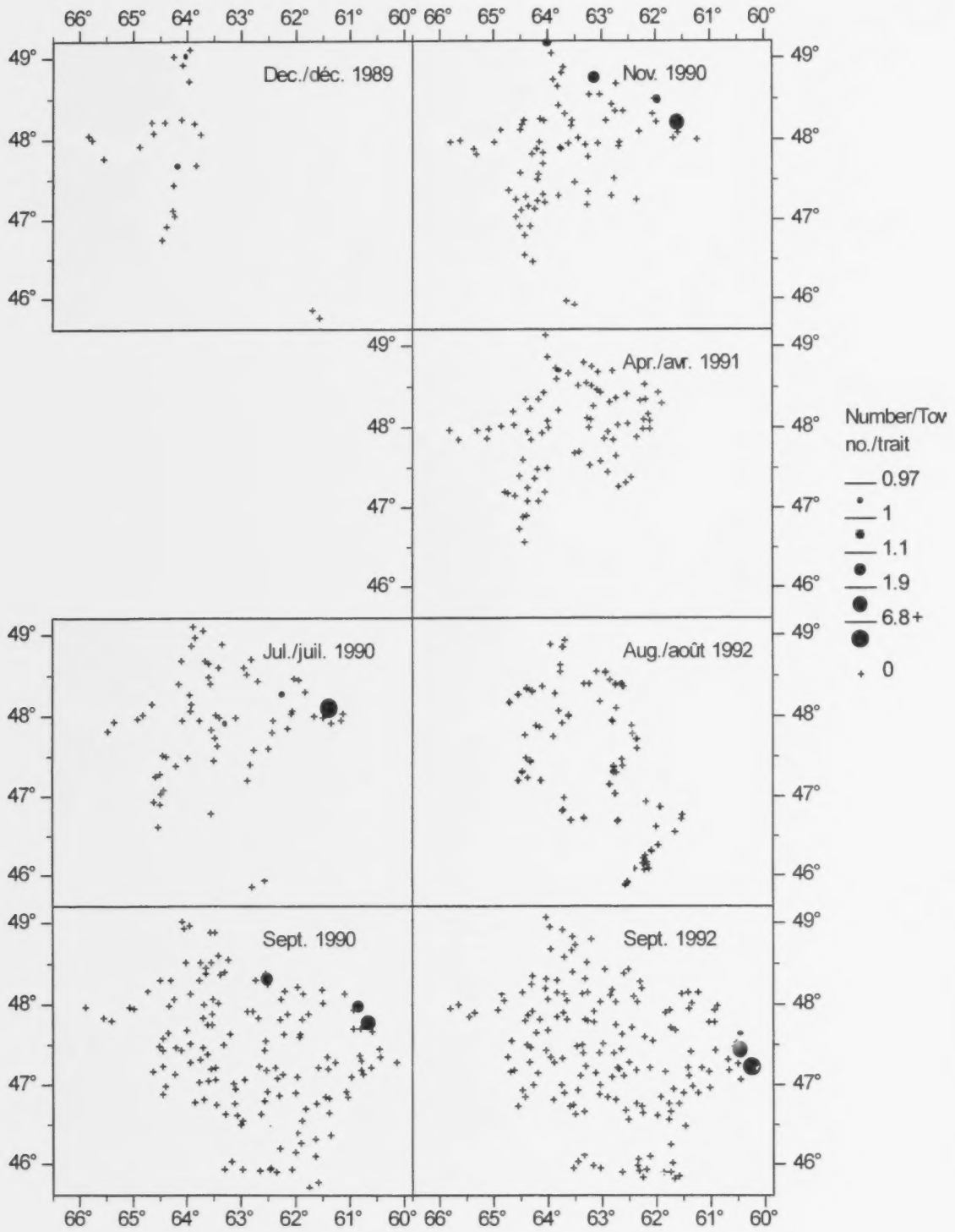

Figure 12d. S.W. Gulf of St. Lawrence seasonal distribution of catches (#/tow) of Pollock, *Pollachius virens*

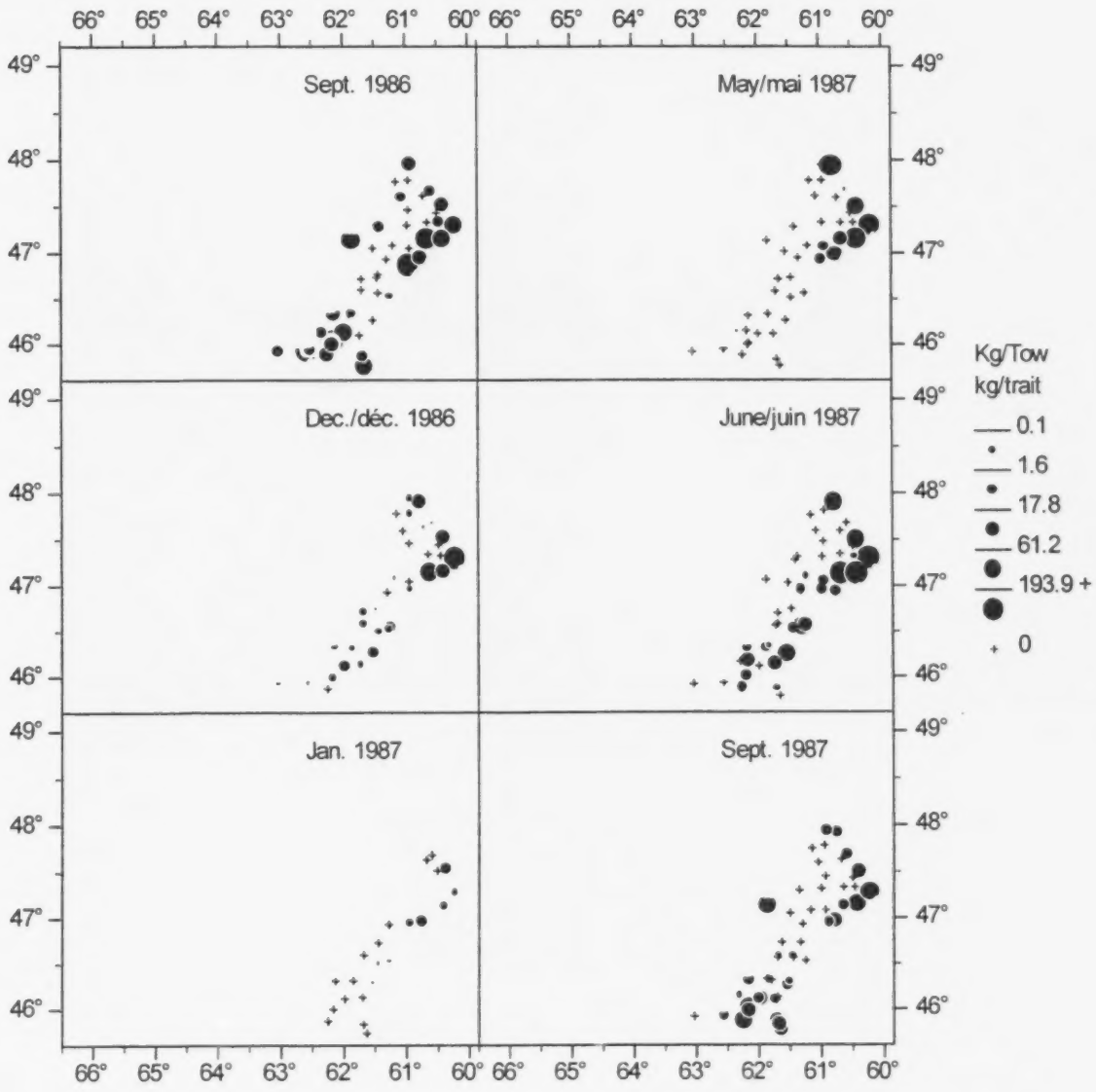

Figure 13a. S.E. Gulf of St. Lawrence seasonal distribution of catches (kg/tow) of White Hake, *Urophycis tenuis*

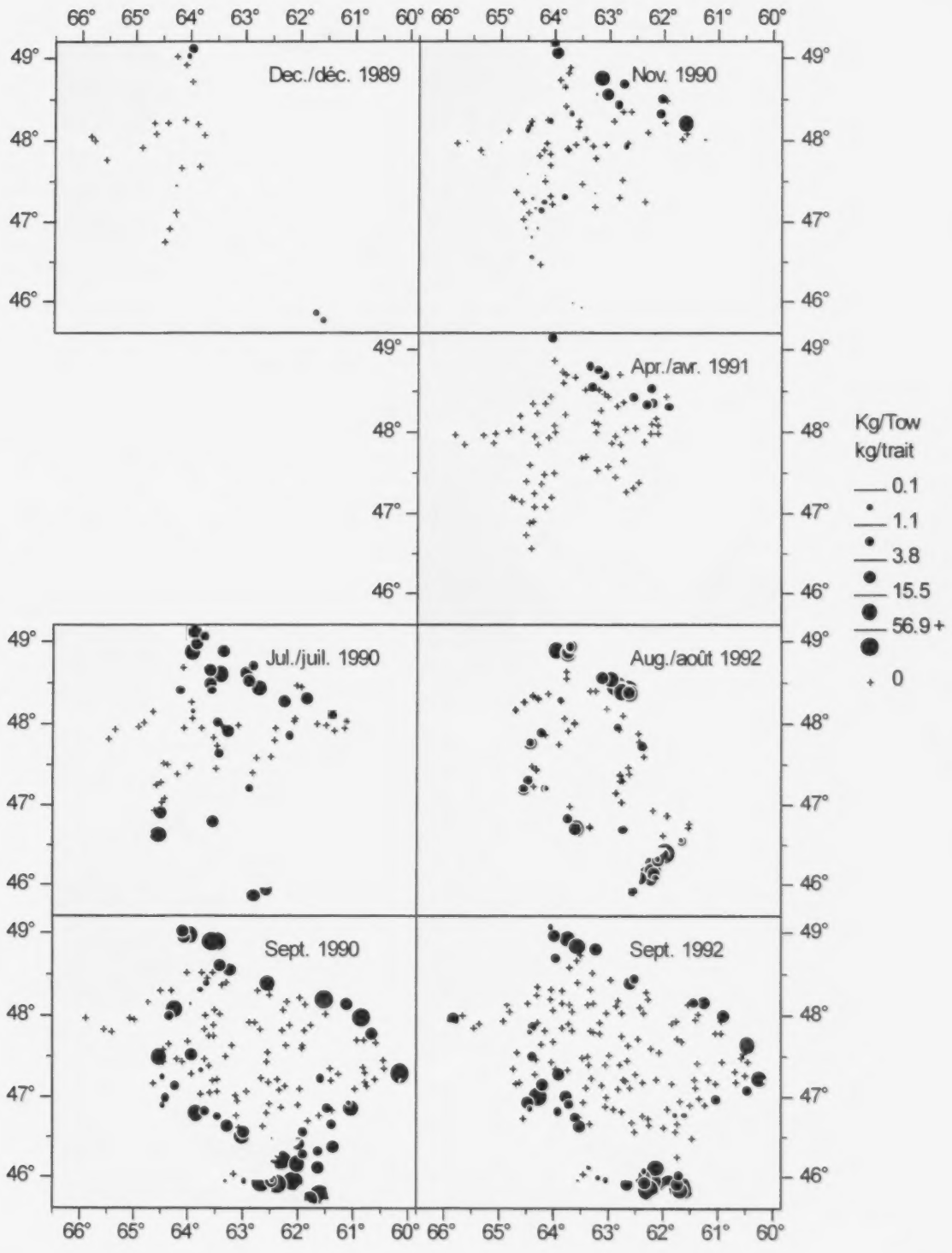

Figure 13b. S.W. Gulf of St. Lawrence seasonal distribution of catches (kg/tow) of White Hake, *Urophycis tenuis*

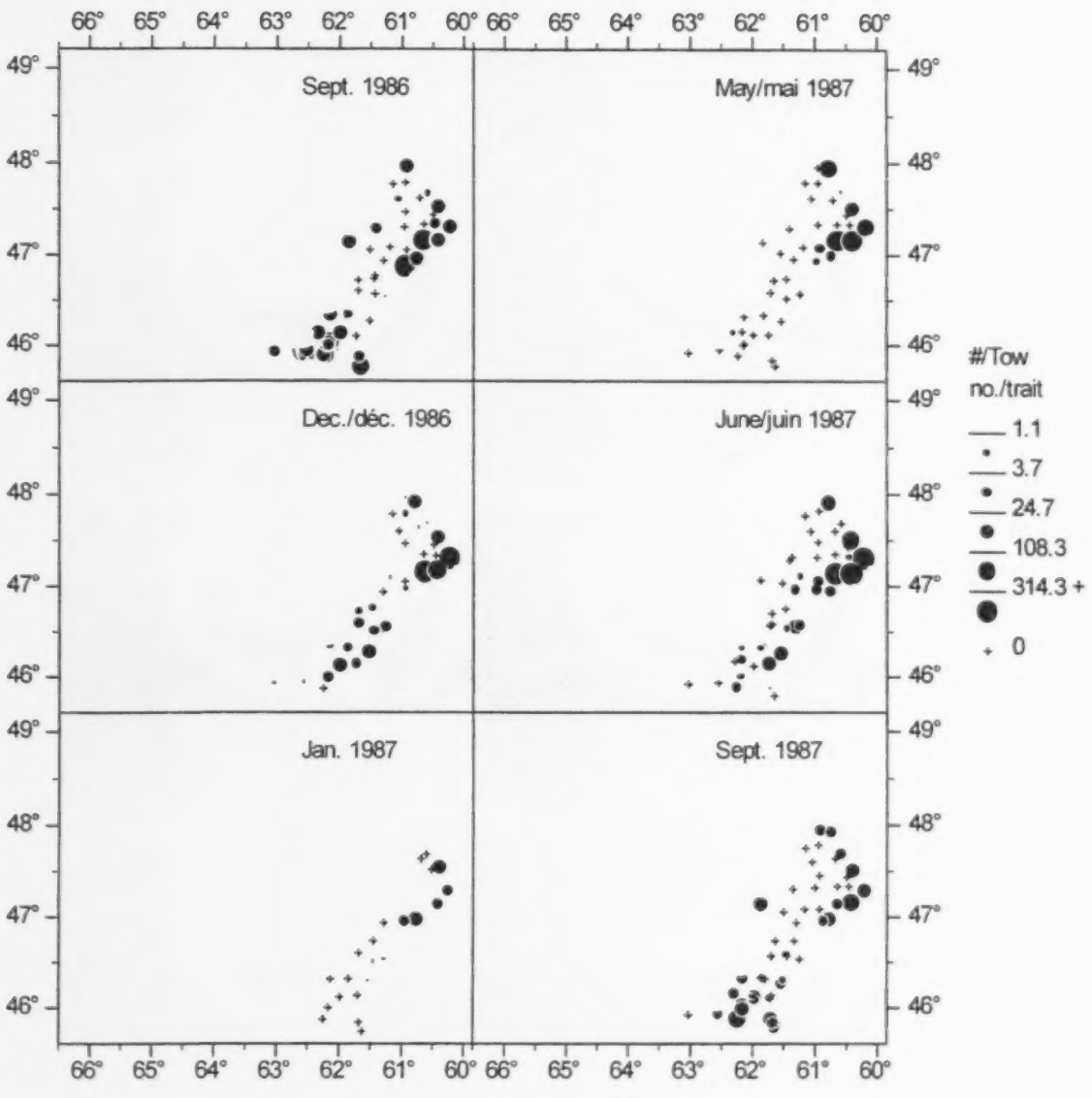

Figure 13c. S.E. Gulf of St. Lawrence seasonal distribution of catches (#/tow) of White Hake, *Urophycis tenuis*

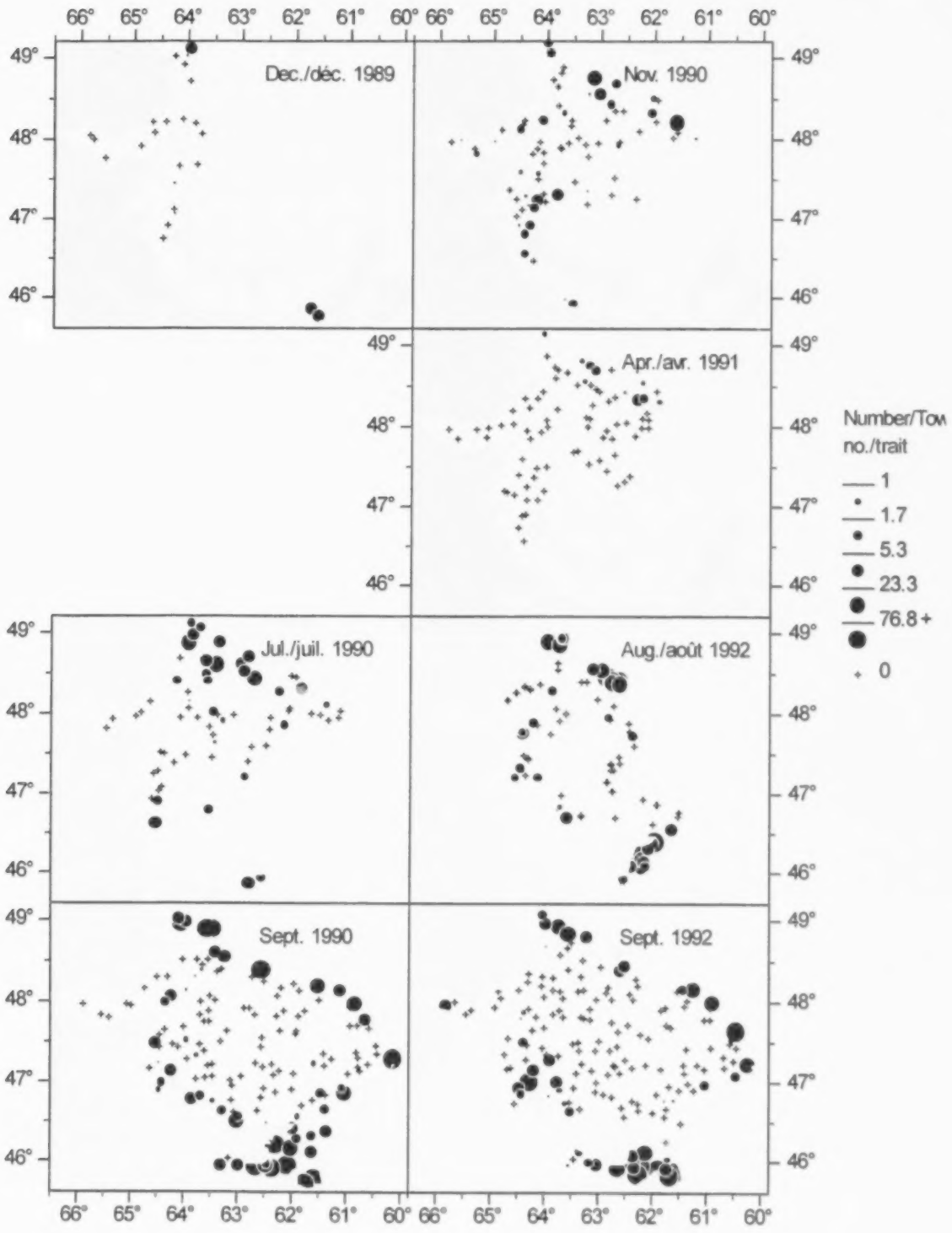

Figure 13d. S.W. Gulf of St. Lawrence seasonal distribution of catches (#/tow) of White Hake, *Urophycis tenuis*

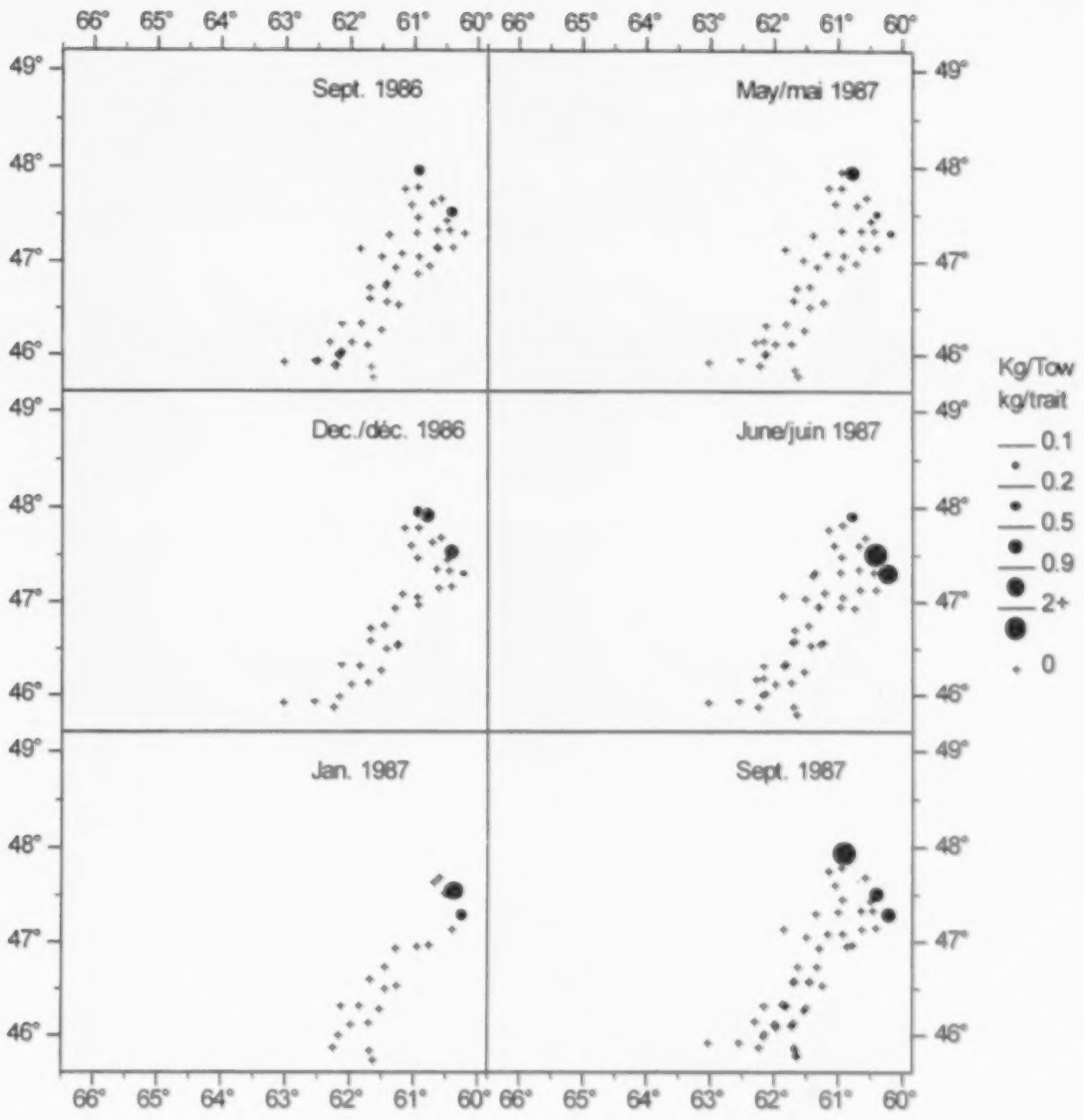

Figure 14a. S.E. Gulf of St. Lawrence seasonal distribution of catches (kg/tow) of Marlin-Spike Grenadier, *Nezumia bairdii*

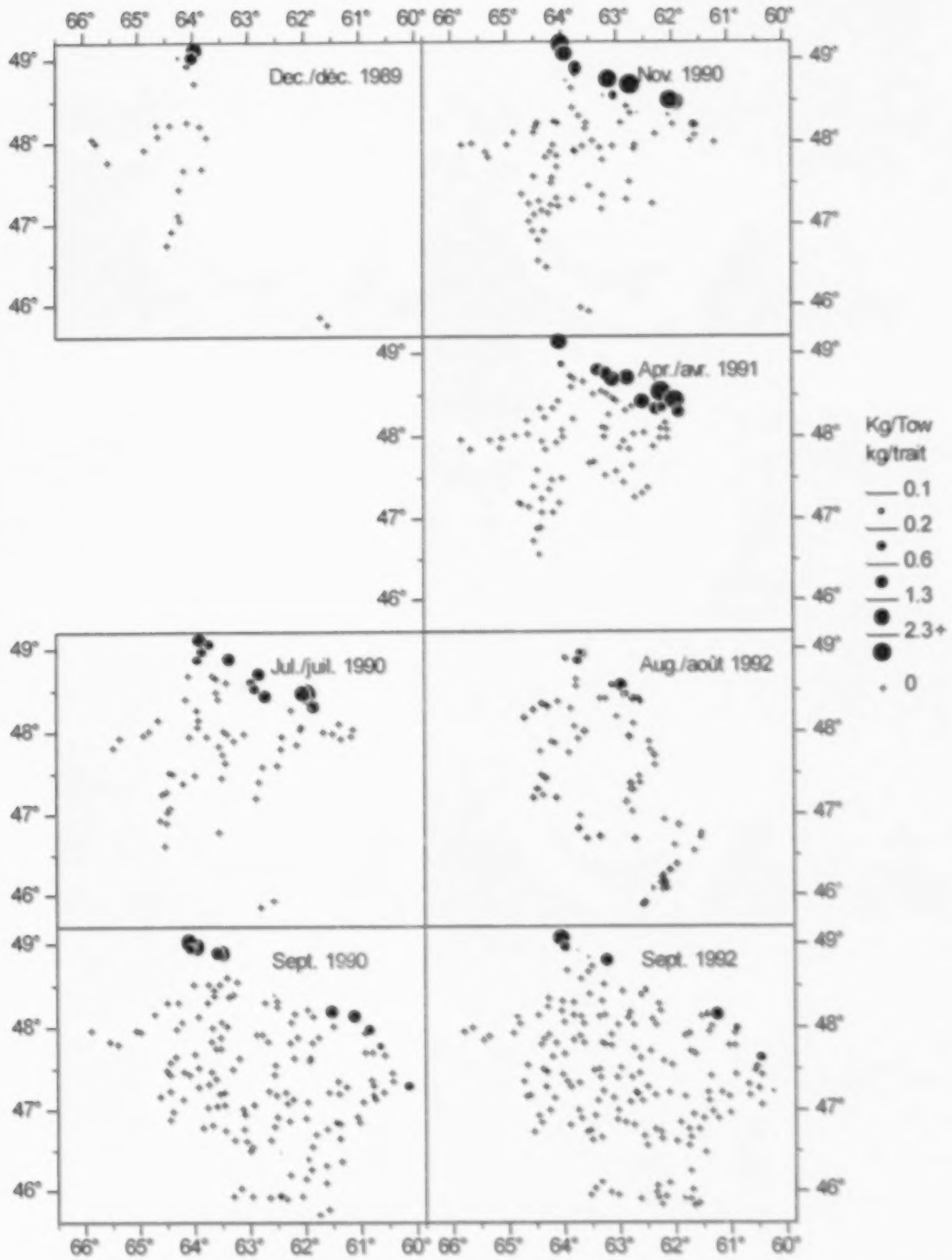

Figure 14b. S.W. Gulf of St. Lawrence seasonal distribution of catches (kg/tow) of Marlin-Spike Grenadier, *Nezumia bairdi*

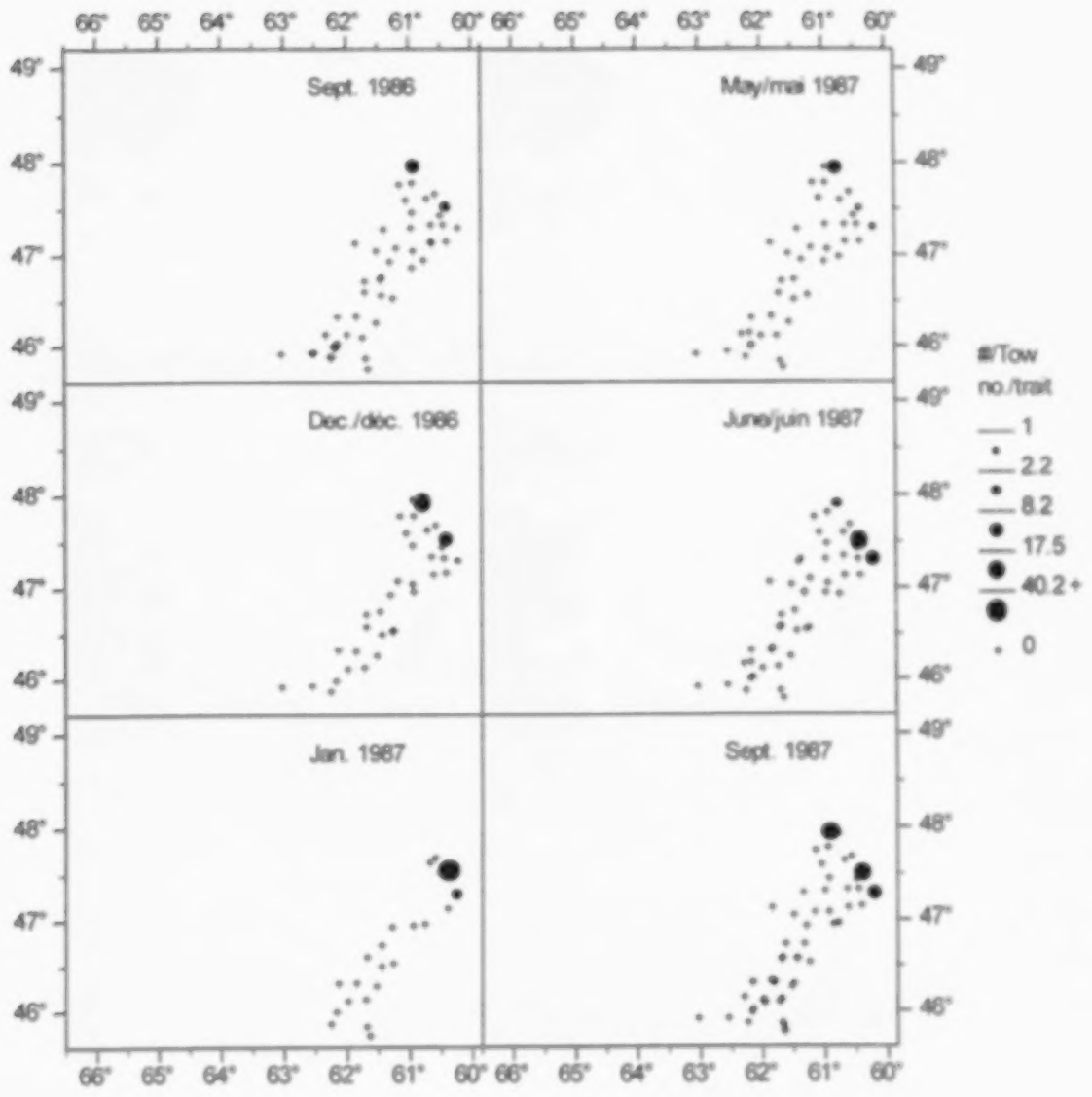

Figure 14c. S.E. Gulf of St. Lawrence seasonal distribution of catches (#/tow) of Marlin-Spike Grenadier, *Nezumia bairdi*

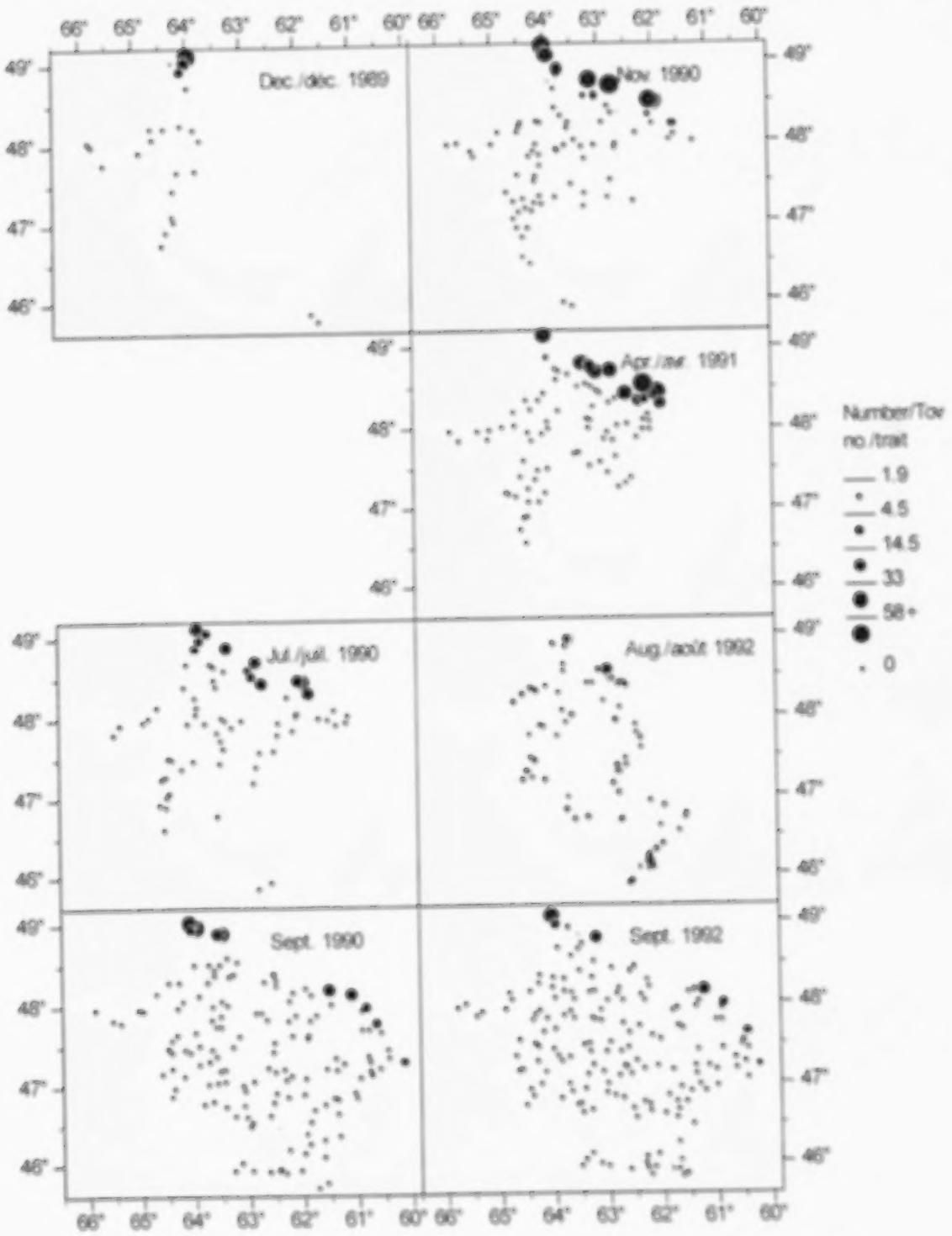

Figure 14d. S.W. Gulf of St. Lawrence seasonal distribution of catches (#/tow) of Marlin-Spike Grenadier, *Nezumia bairdii*

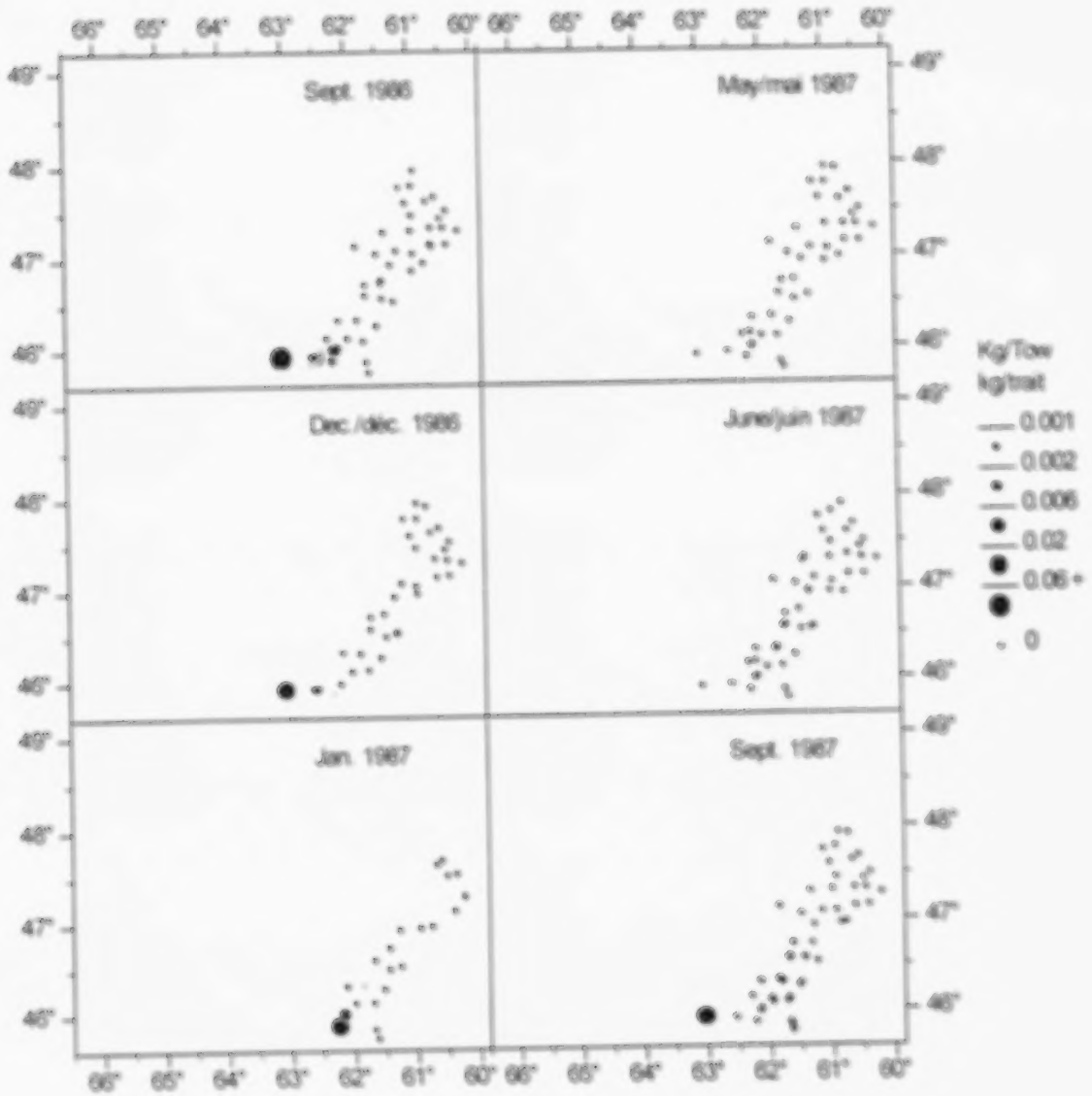

Figure 15a. S.E. Gulf of St. Lawrence seasonal distribution of catches (kg/tow) of Threespine Stickleback, *Gasterosteus aculeatus*

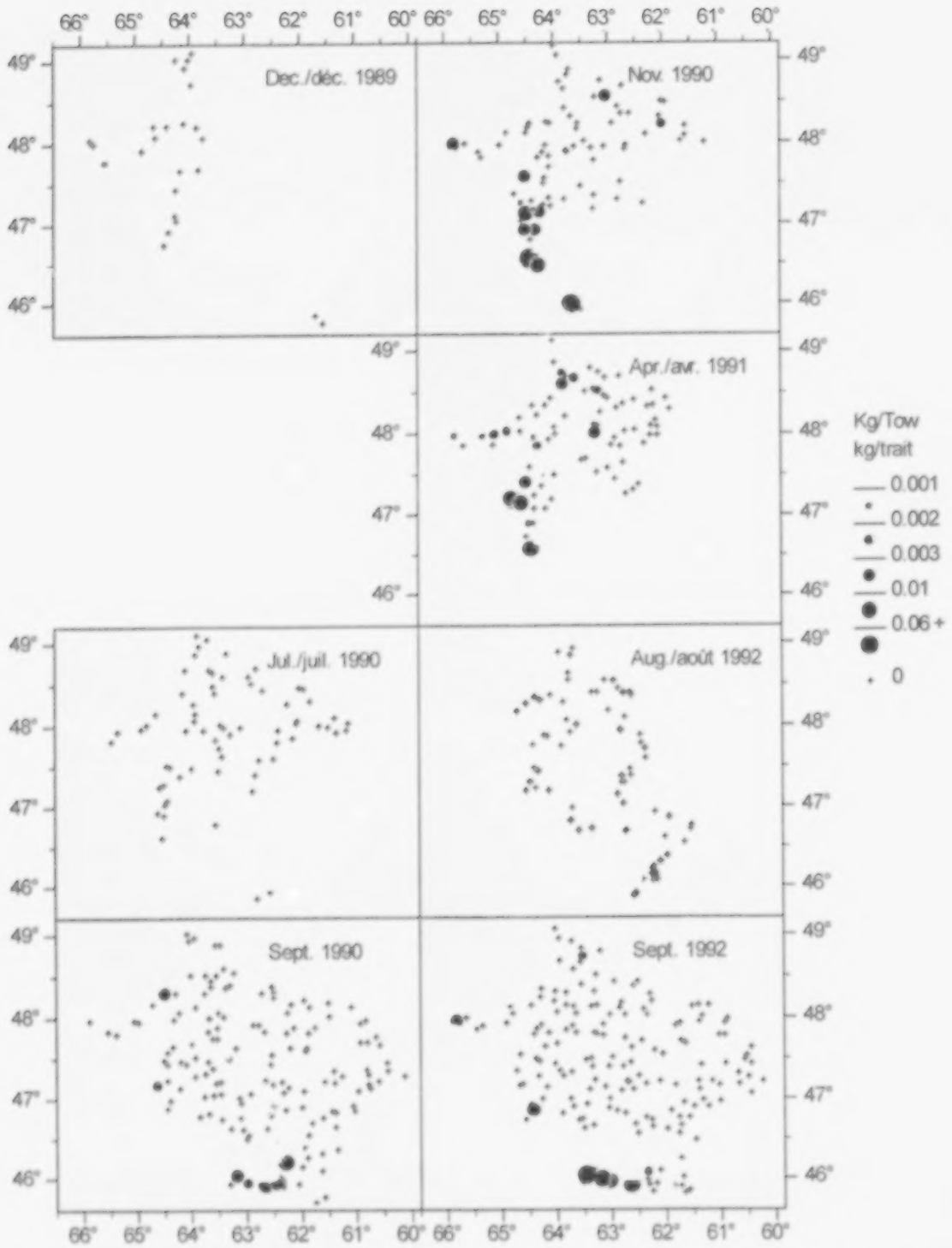

Figure 15b. S.W. Gulf of St. Lawrence seasonal distribution of catches (kg/tow) of Threespine Stickleback, *Gasterosteus aculeatus*

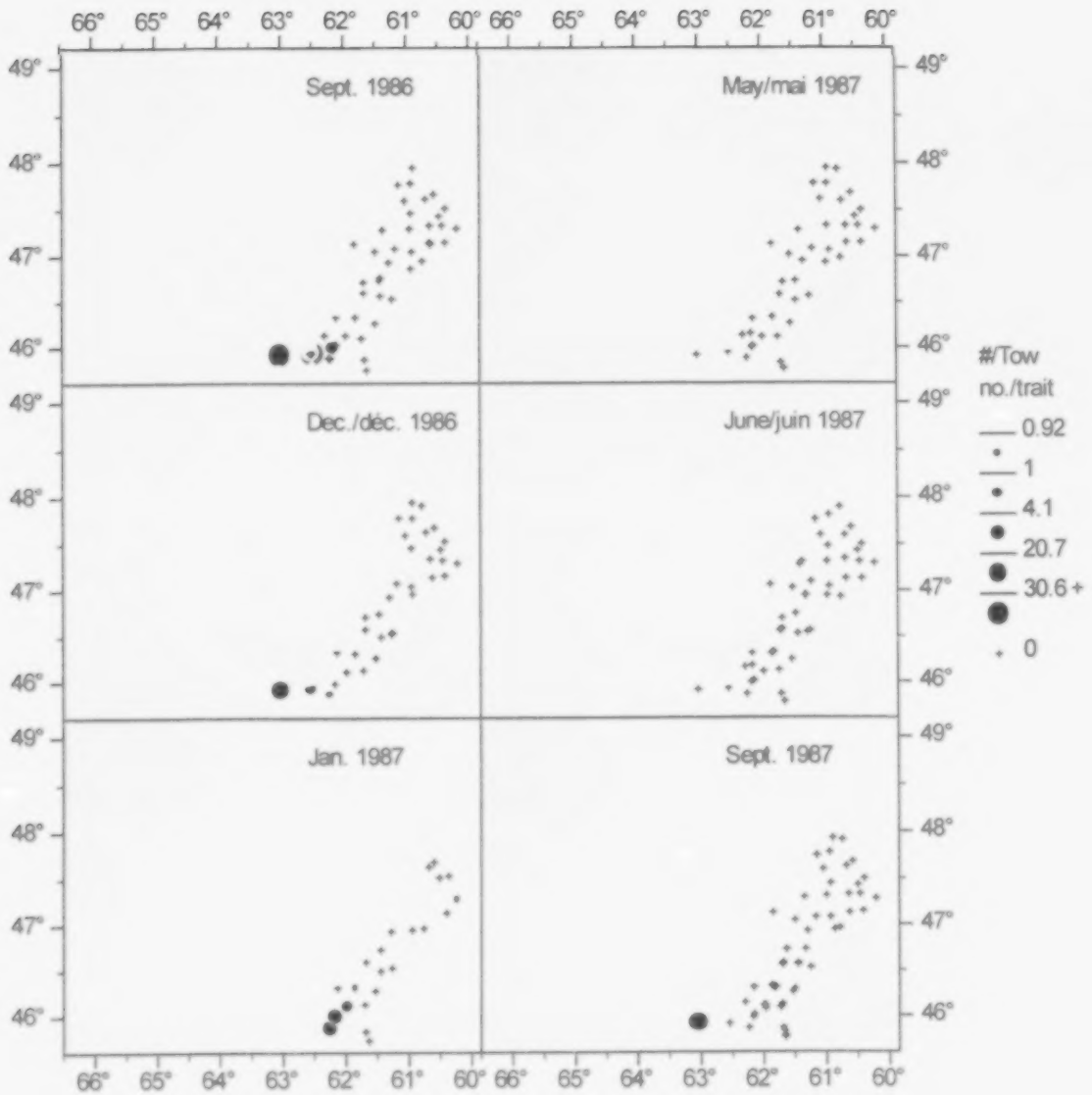

Figure 15c. S.E. Gulf of St. Lawrence seasonal distribution of catches (#/tow) of Threespine Stickleback, *Gasterosteus aculeatus*

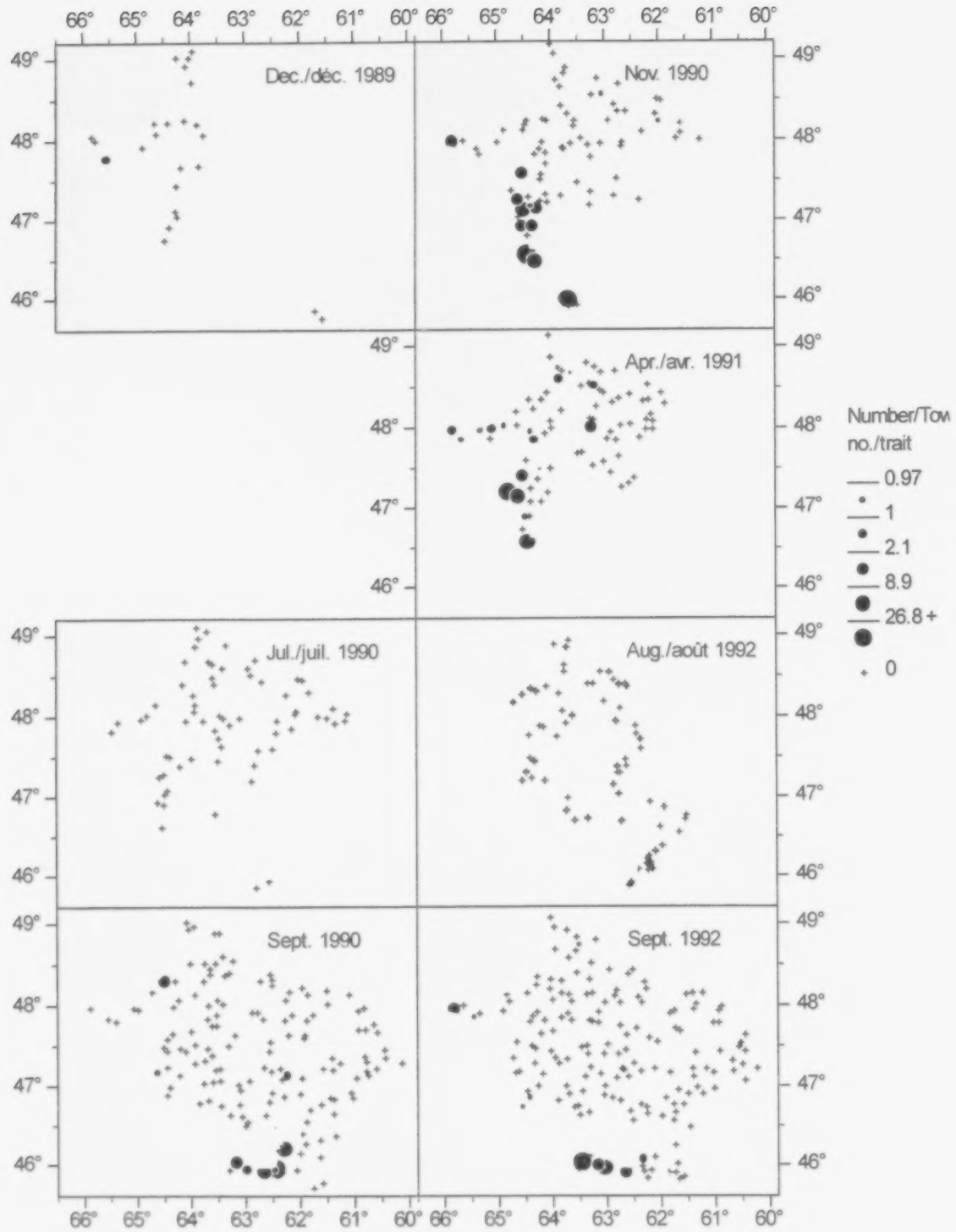

Figure 15d. S.W. Gulf of St. Lawrence seasonal distribution of catches (#/tow) of Threespine Stickleback, *Gasterosteus aculeatus*

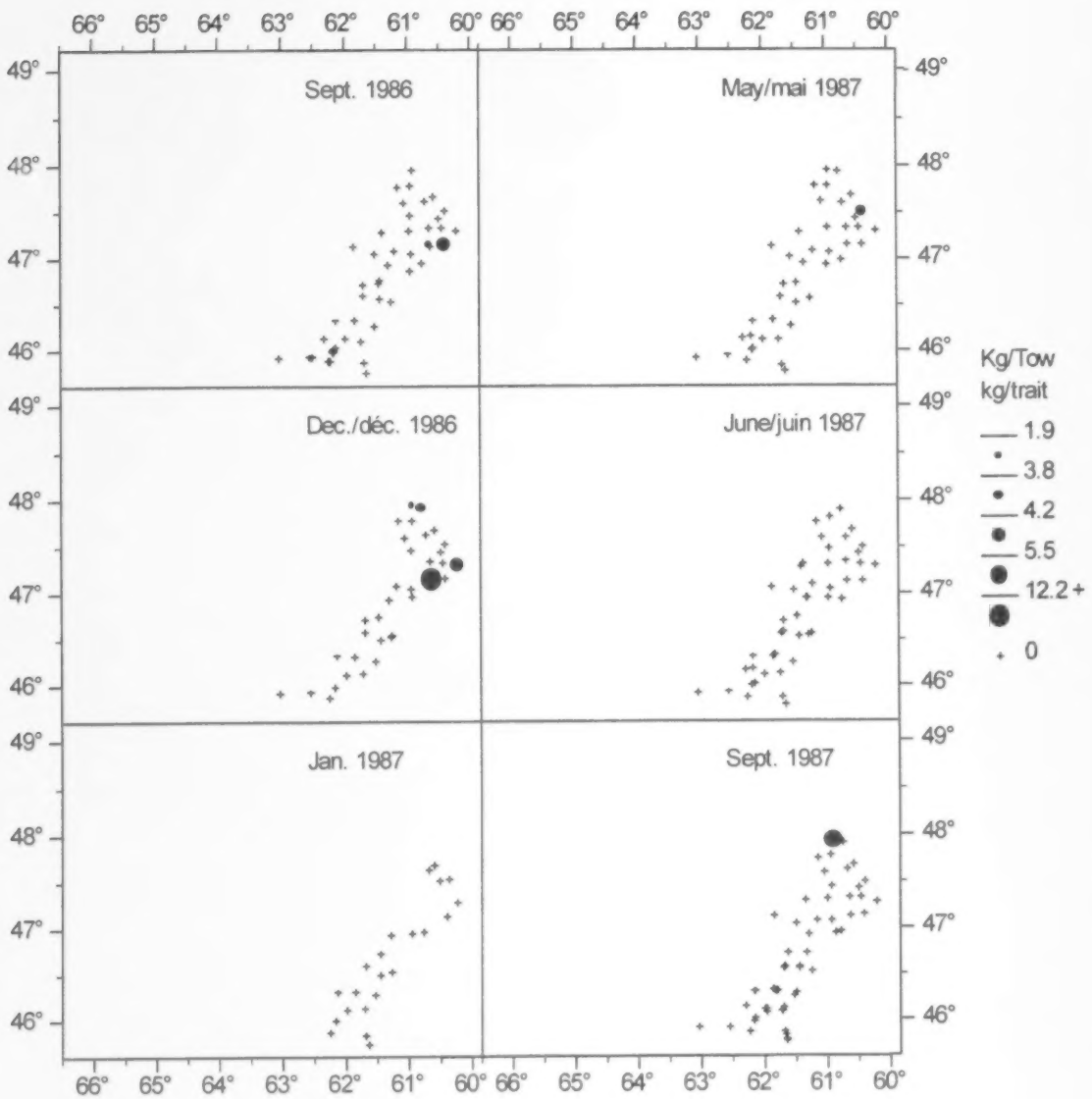

Figure 16a. S.E. Gulf of St. Lawrence seasonal distribution of catches (kg/tow) of Monkfish, *Lophius americanus*

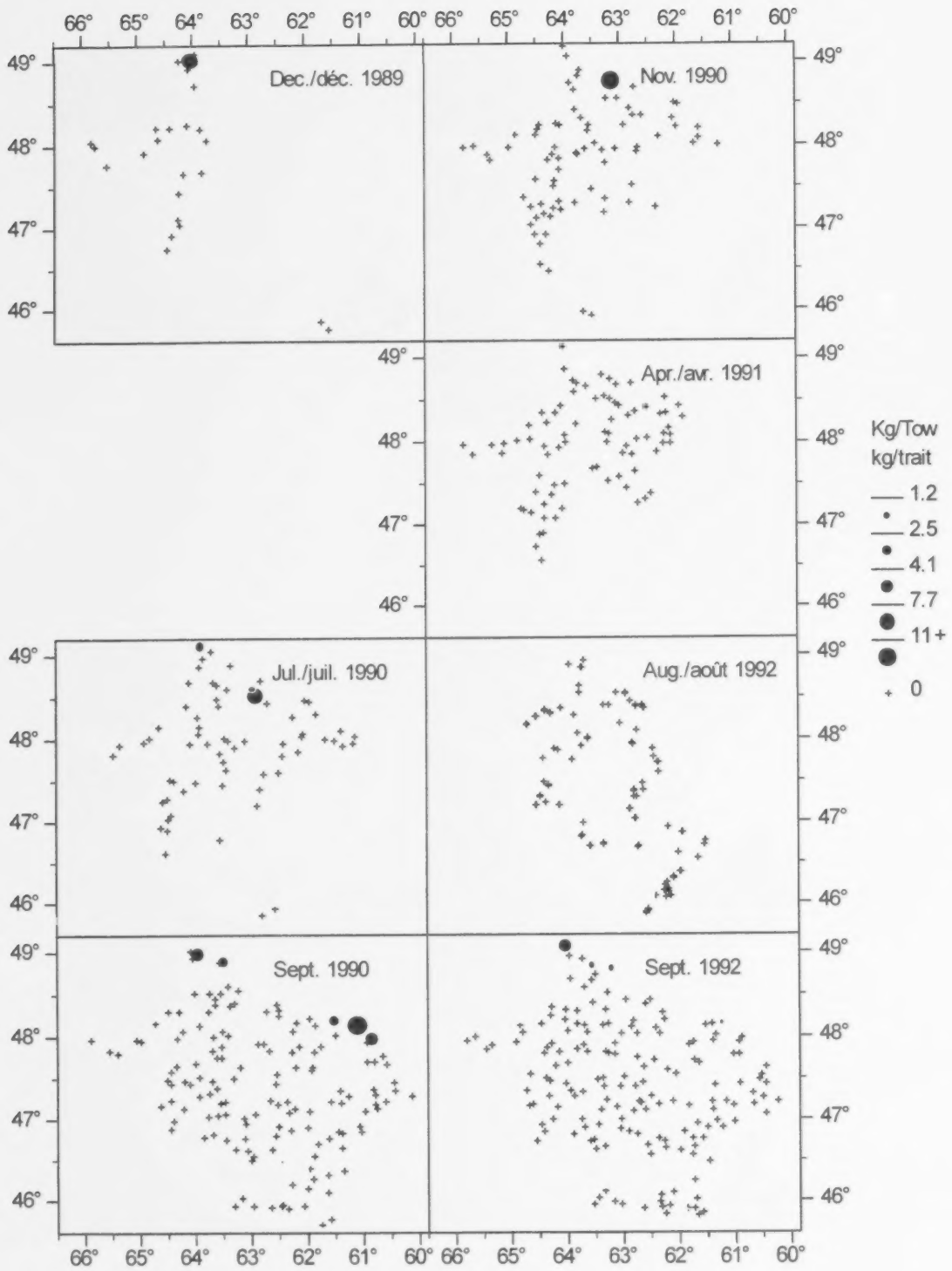

Figure 16b. S.W. Gulf of St. Lawrence seasonal distribution of catches (kg/tow) of Monkfish, *Lophius americanus*

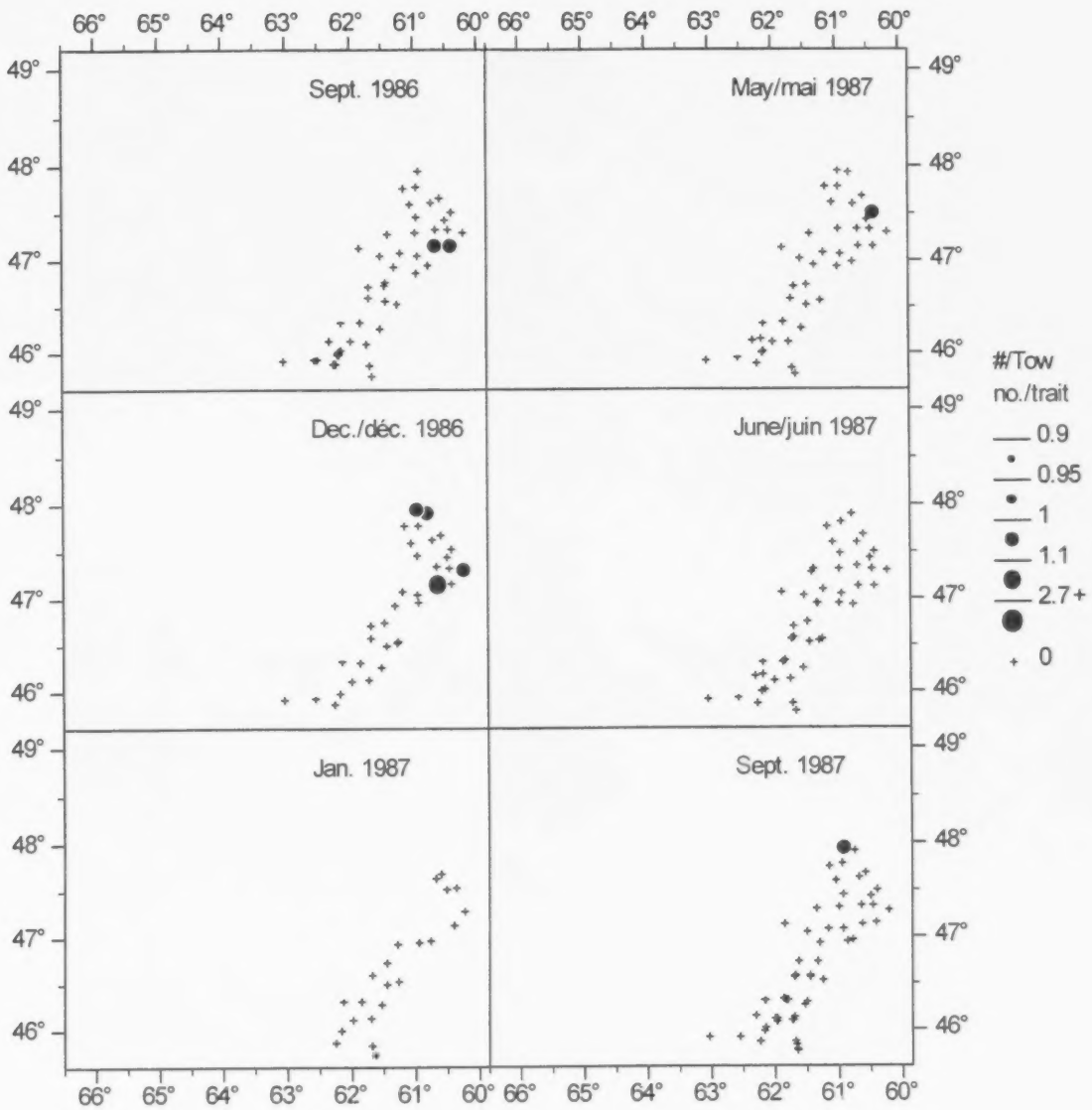

Figure 16c. S.E. Gulf of St. Lawrence seasonal distribution of catches (#/tow) of Monkfish, *Lophius americanus*

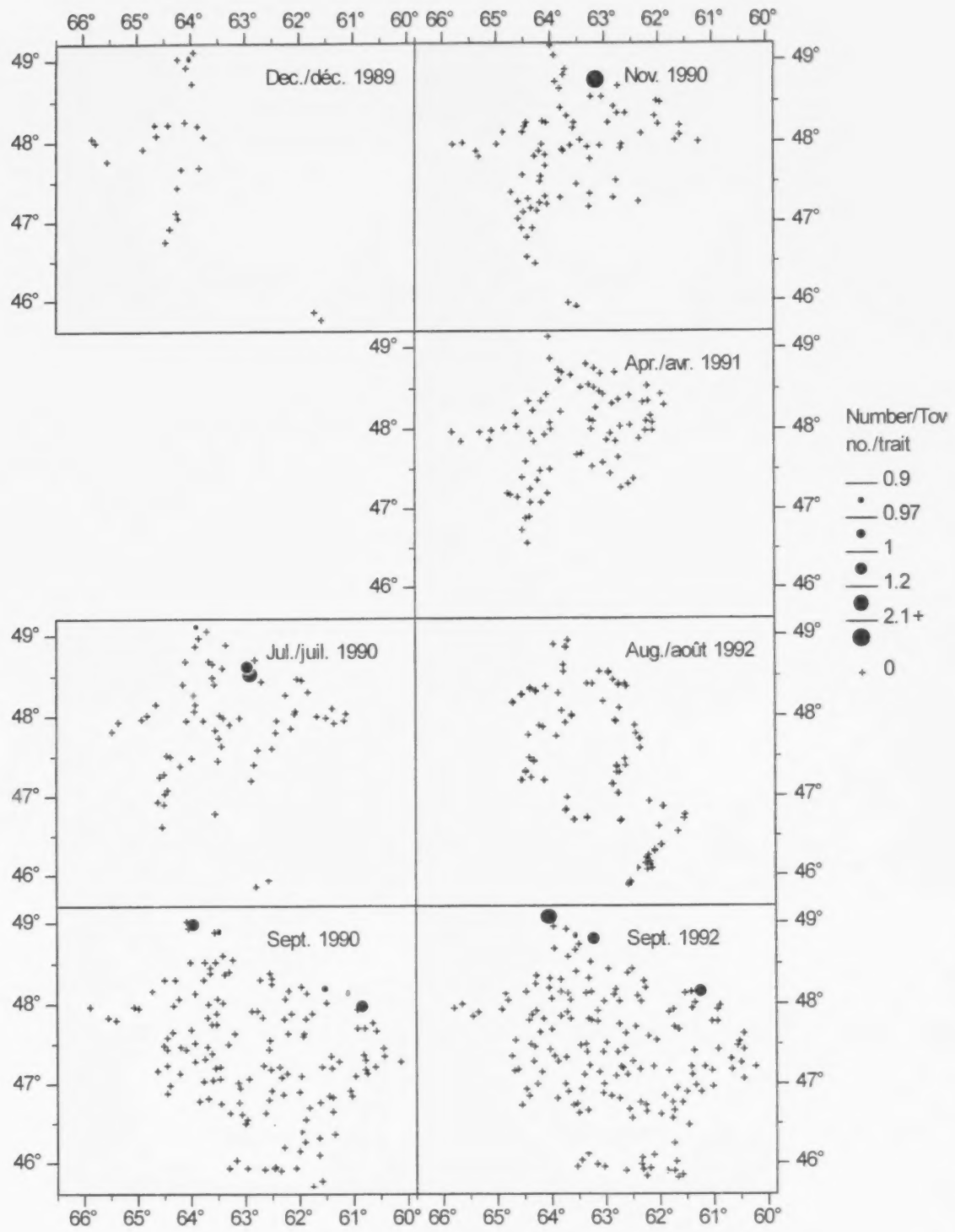

Figure 16d. S.W. Gulf of St. Lawrence seasonal distribution of catches (#/tow) of Monkfish, *Lophius americanus*

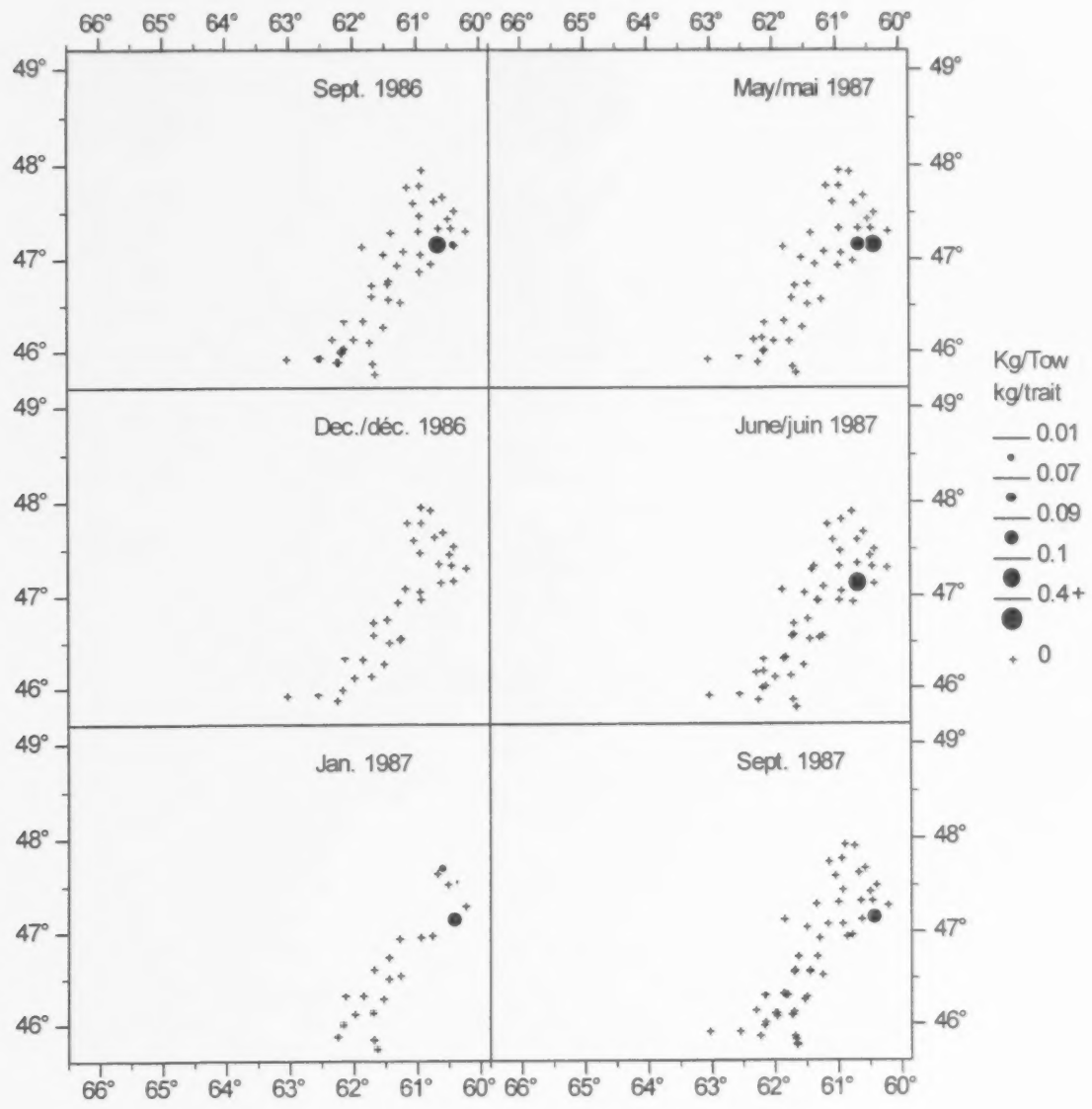

Figure 17a. S.E. Gulf of St. Lawrence seasonal distribution of catches (kg/tow) of Northern Hagfish, *Myxine glutinosa*

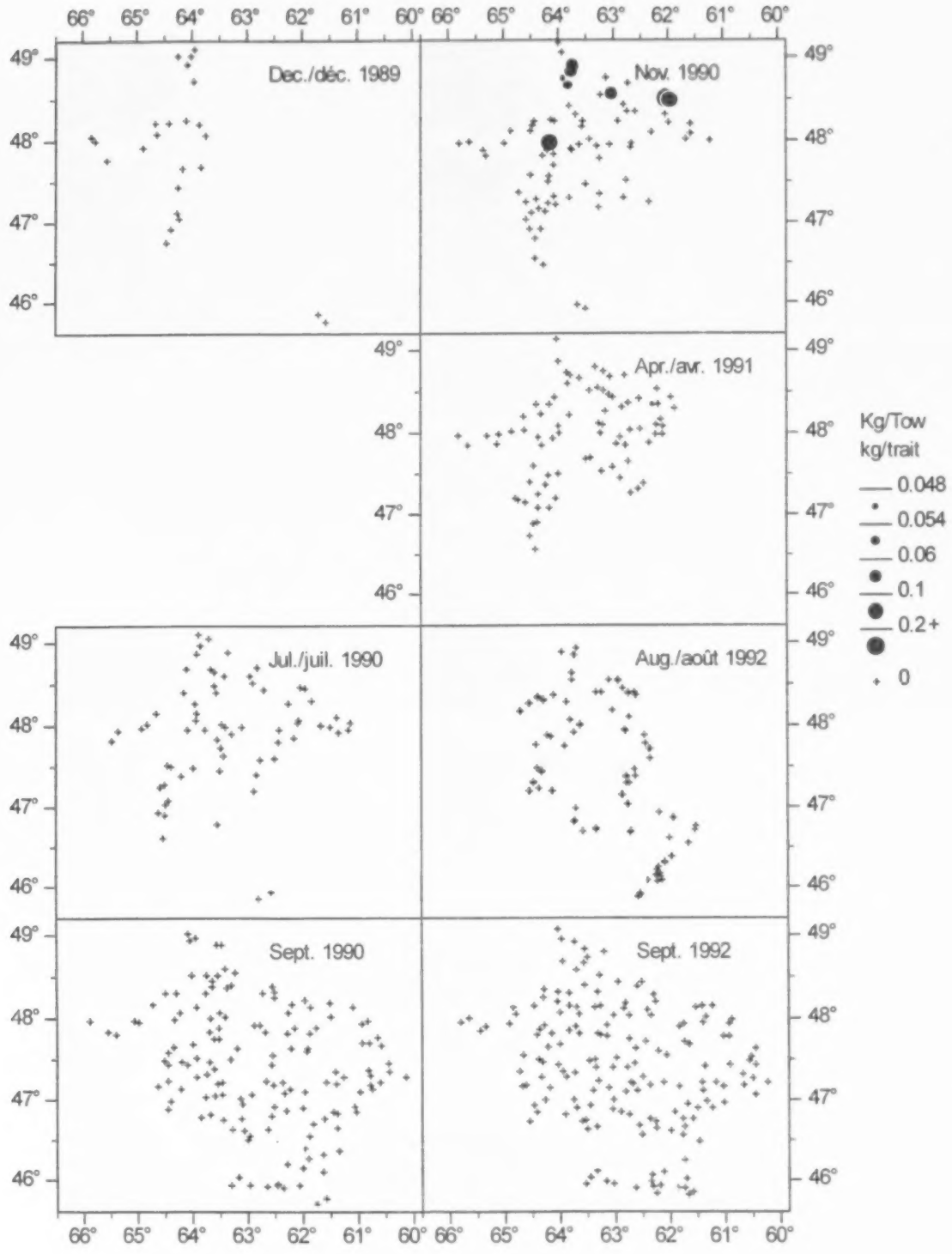

Figure 17b. S.W. Gulf of St. Lawrence seasonal distribution of catches (kg/tow) of Northern Hagfish, *Myxine glutinosa*

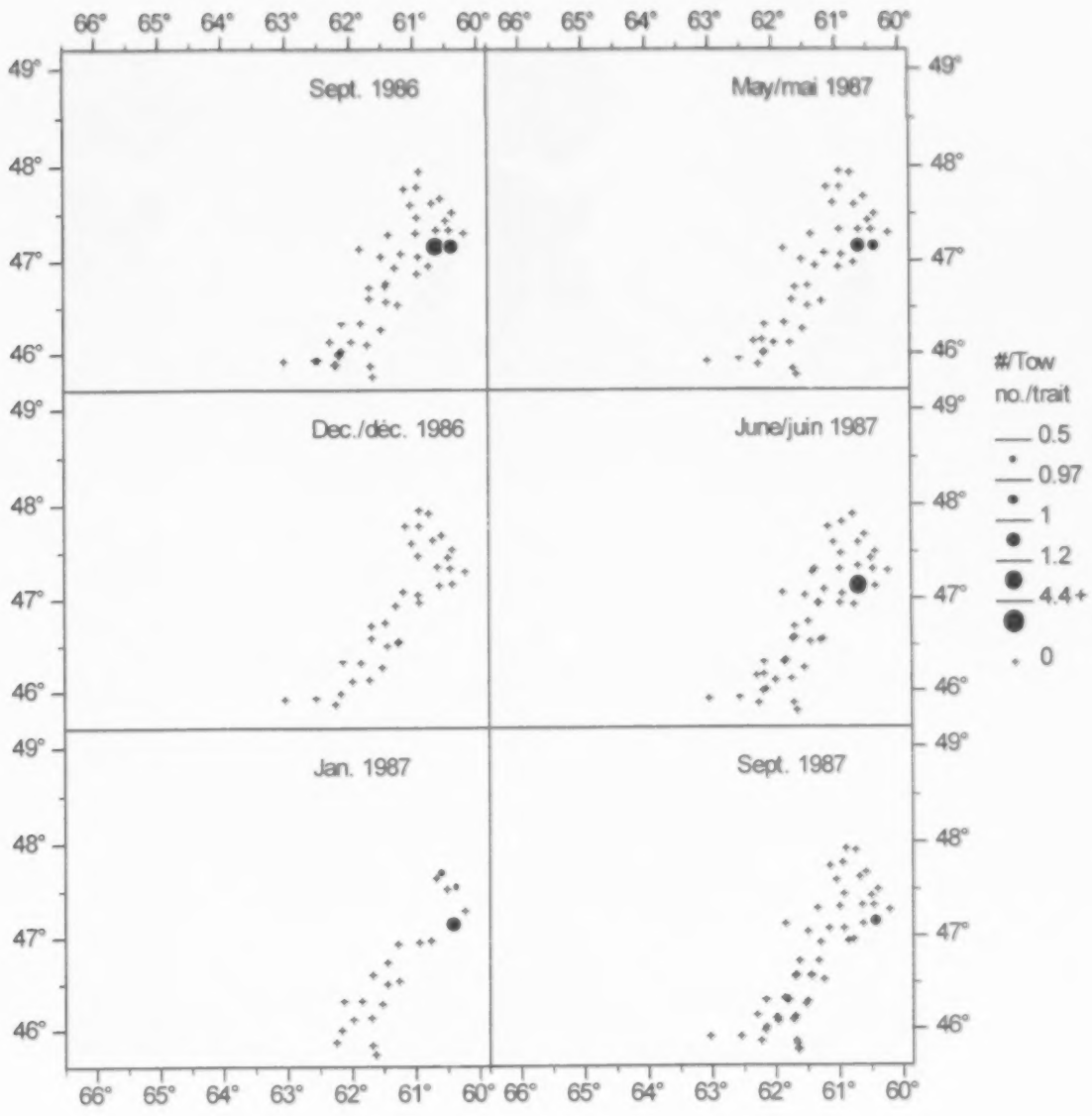

Figure 17c. S.E. Gulf of St. Lawrence seasonal distribution of catches (#/tow) of Northern Hagfish, *Myxine glutinosa*

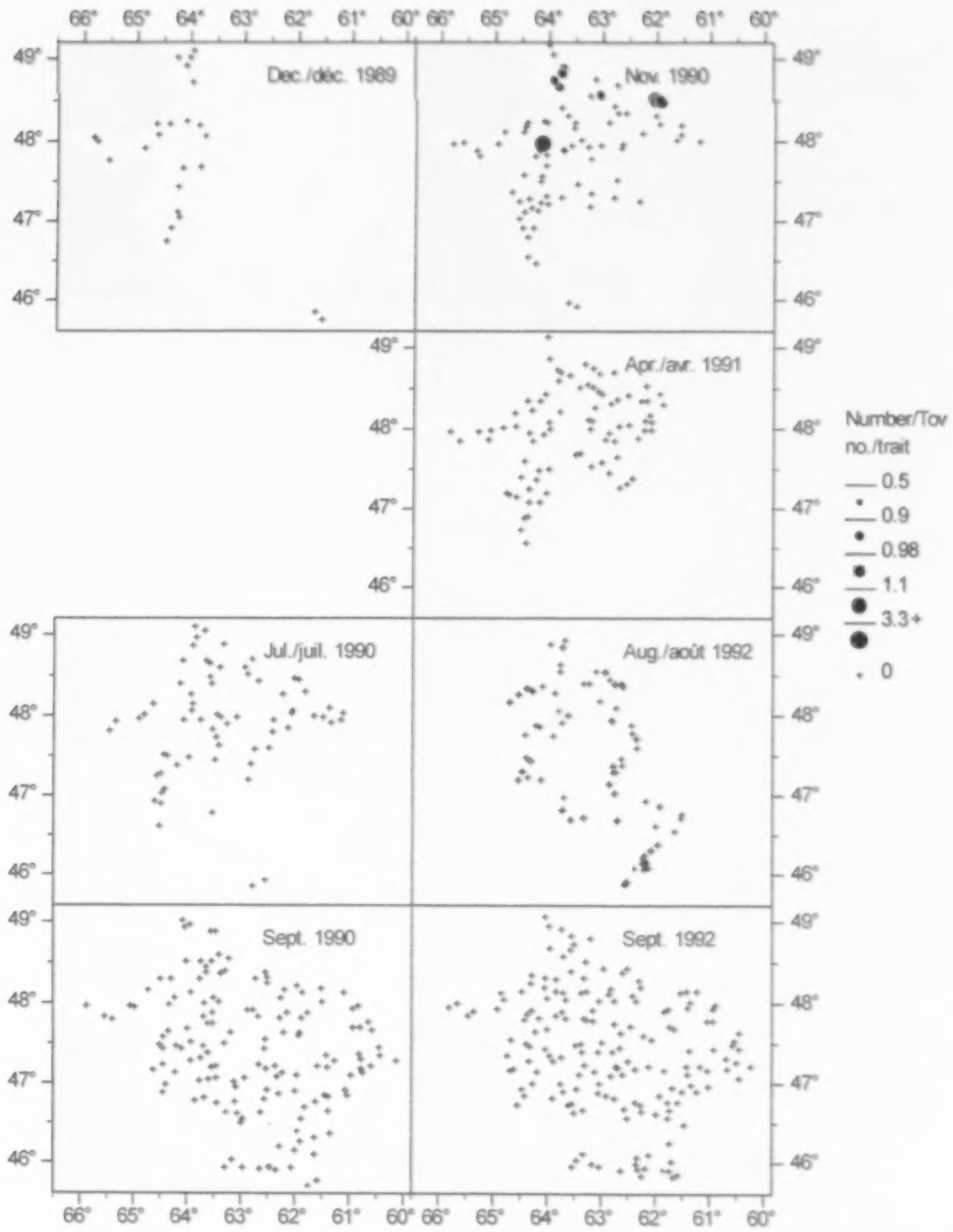

Figure 17d. S.W. Gulf of St. Lawrence seasonal distribution of catches (#/tow) of Northern Hagfish, *Myxine glutinosa*

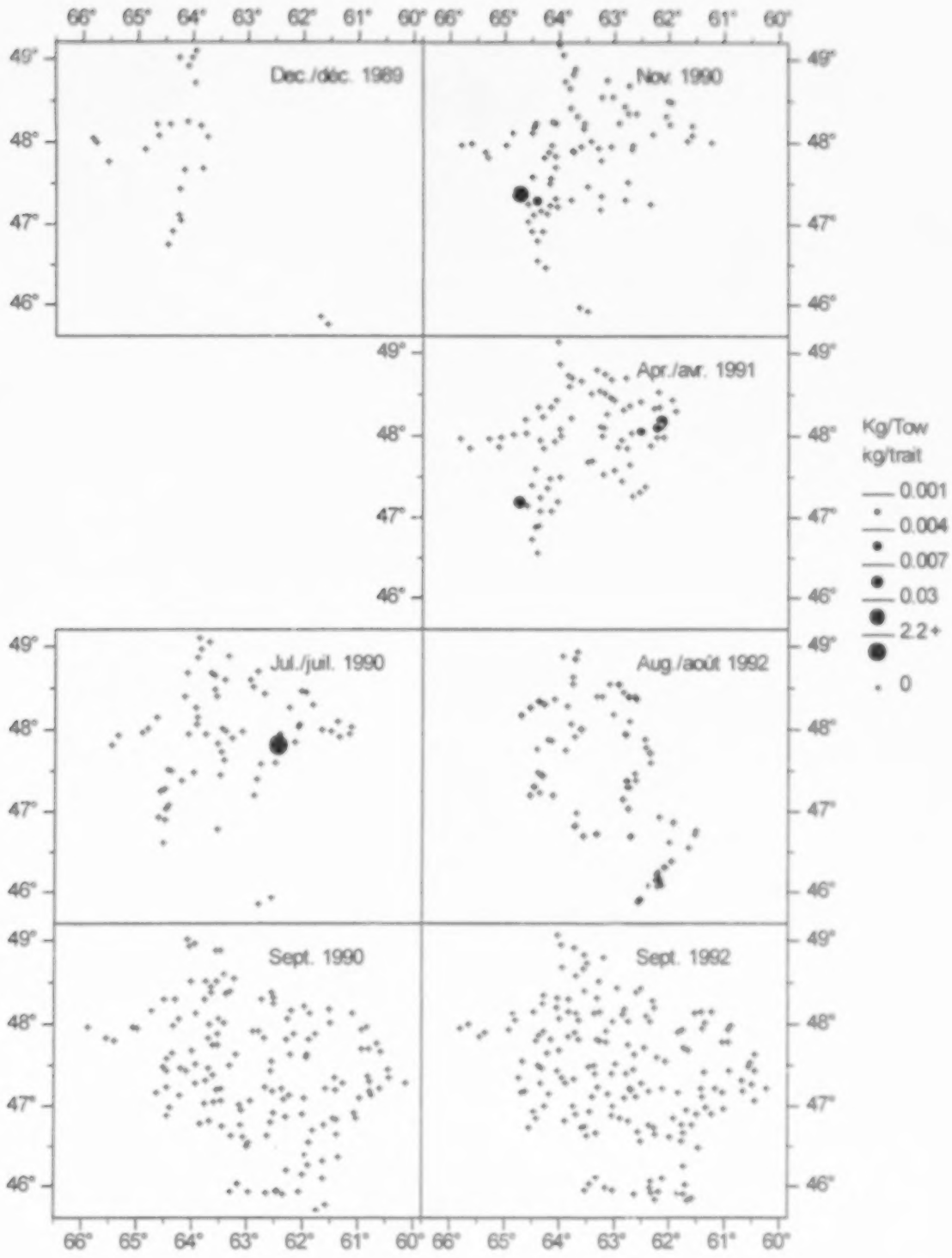

Figure 18a. S.W. Gulf of St. Lawrence seasonal distribution of catches (kg/tow) of Northern Sand Lance, *Ammodytes dubius*

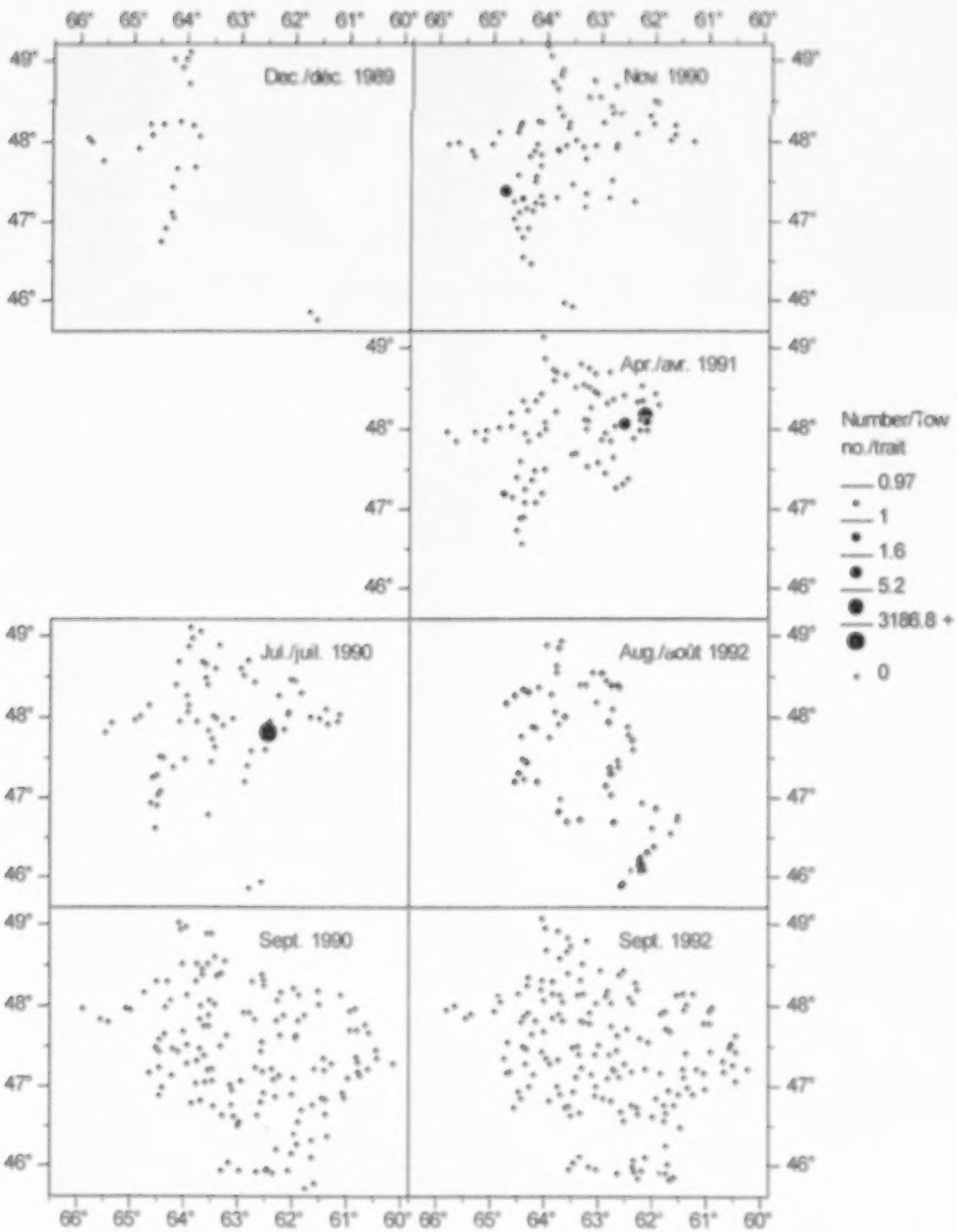

Figure 18b. S.W. Gulf of St. Lawrence seasonal distribution of catches (#/tow) of Northern Sand Lance, *Ammodytes dubius*

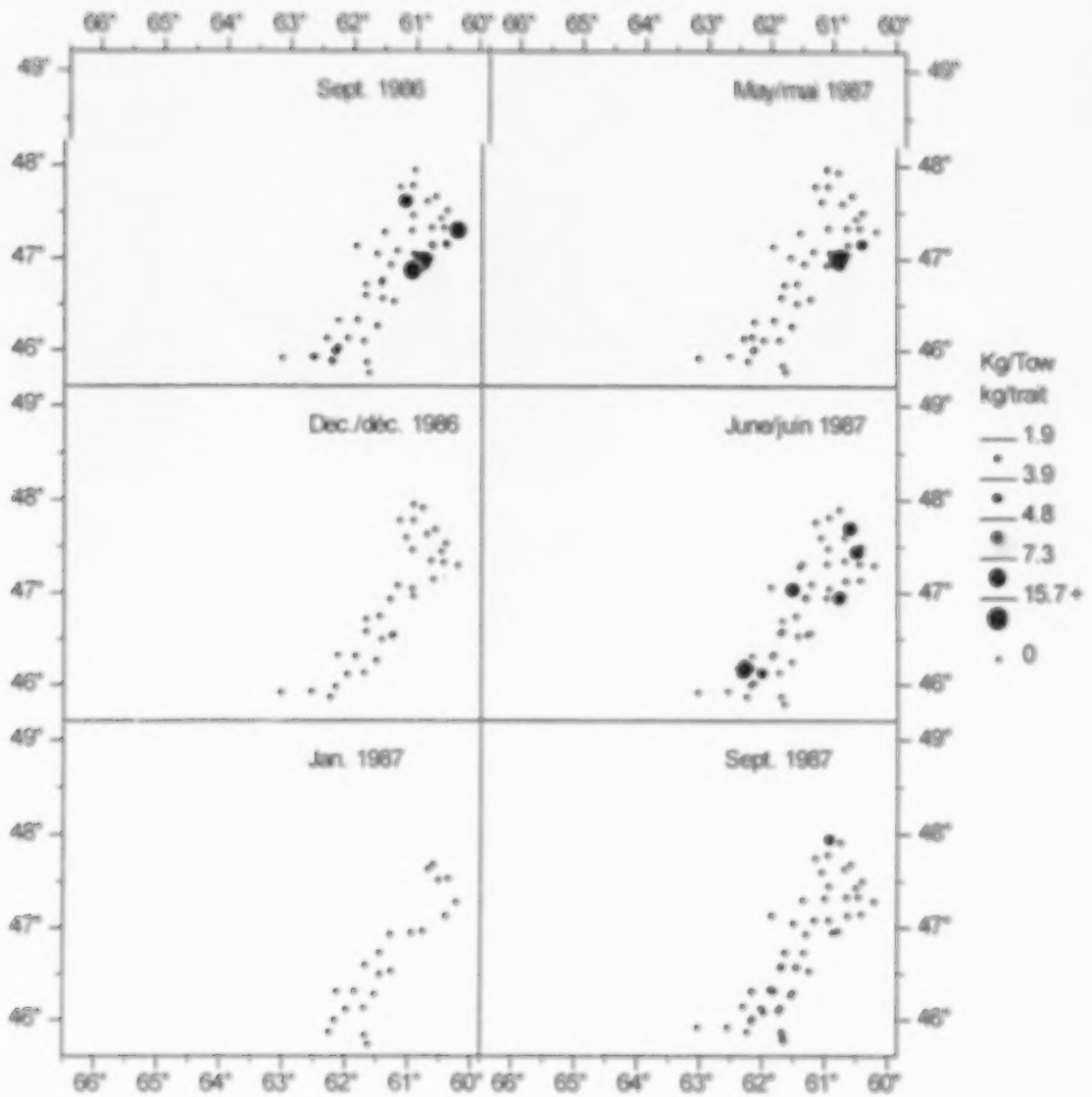

Figure 19a. S.E. Gulf of St. Lawrence seasonal distribution of catches (kg/tow) of Atlantic Wolffish, *Anarhichas lupus*

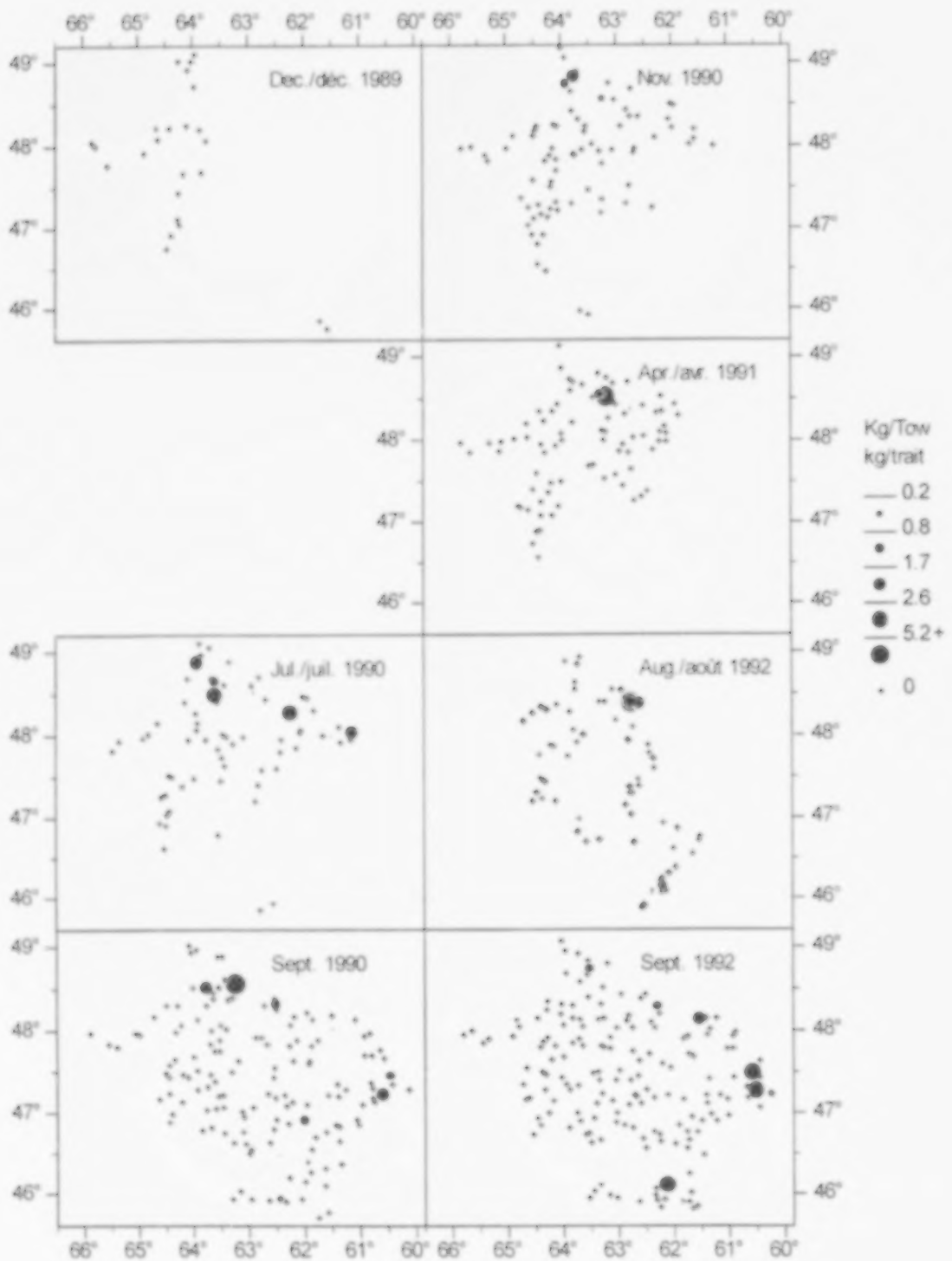

Figure 19b. S.W. Gulf of St. Lawrence seasonal distribution of catches (kg/tow) of Atlantic Wolffish, *Anarhichas lupus*

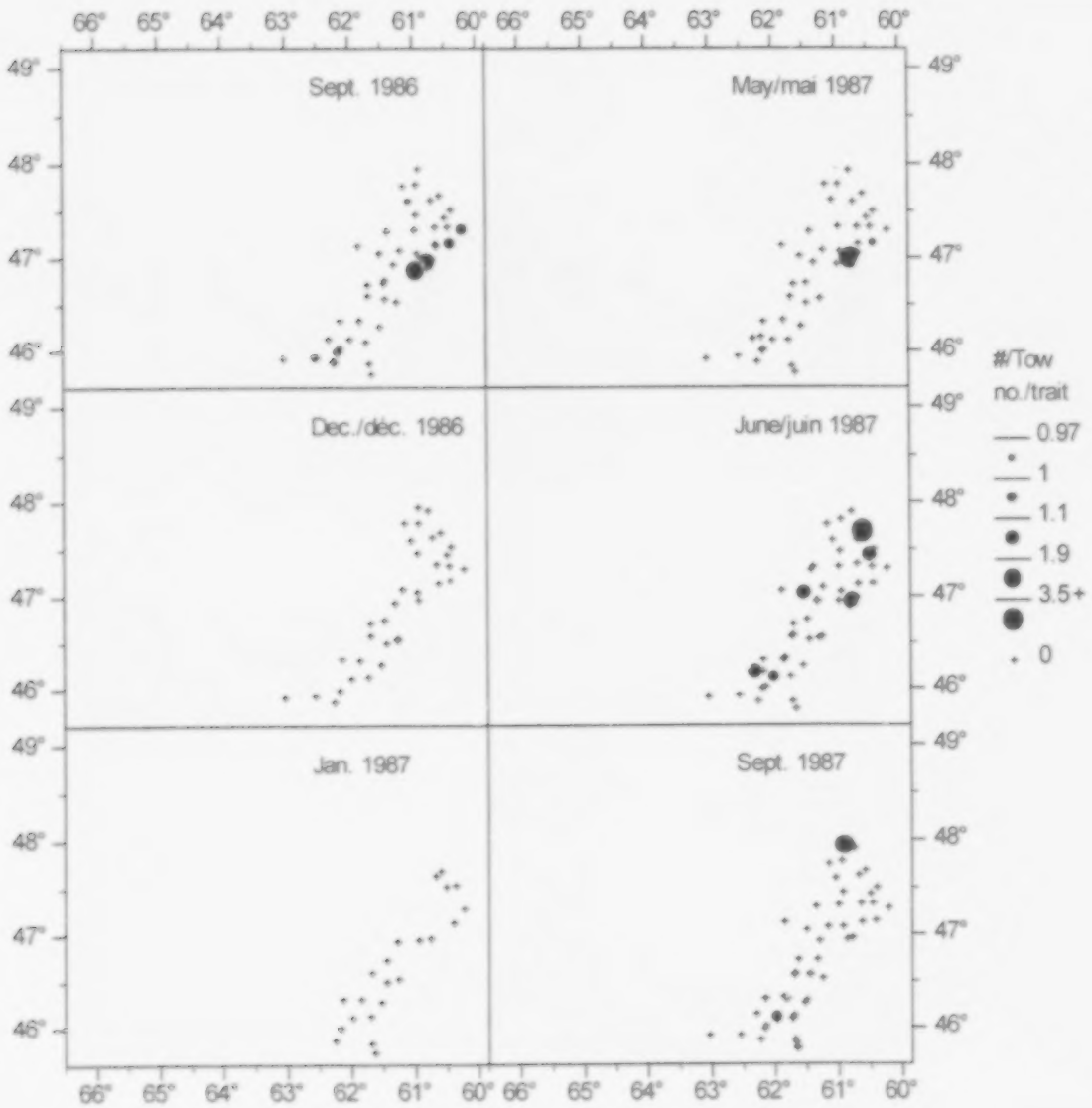

Figure 19c. S.E. Gulf of St. Lawrence seasonal distribution of catches (#/tow) of Atlantic Wolffish, *Anarhichas lupus*

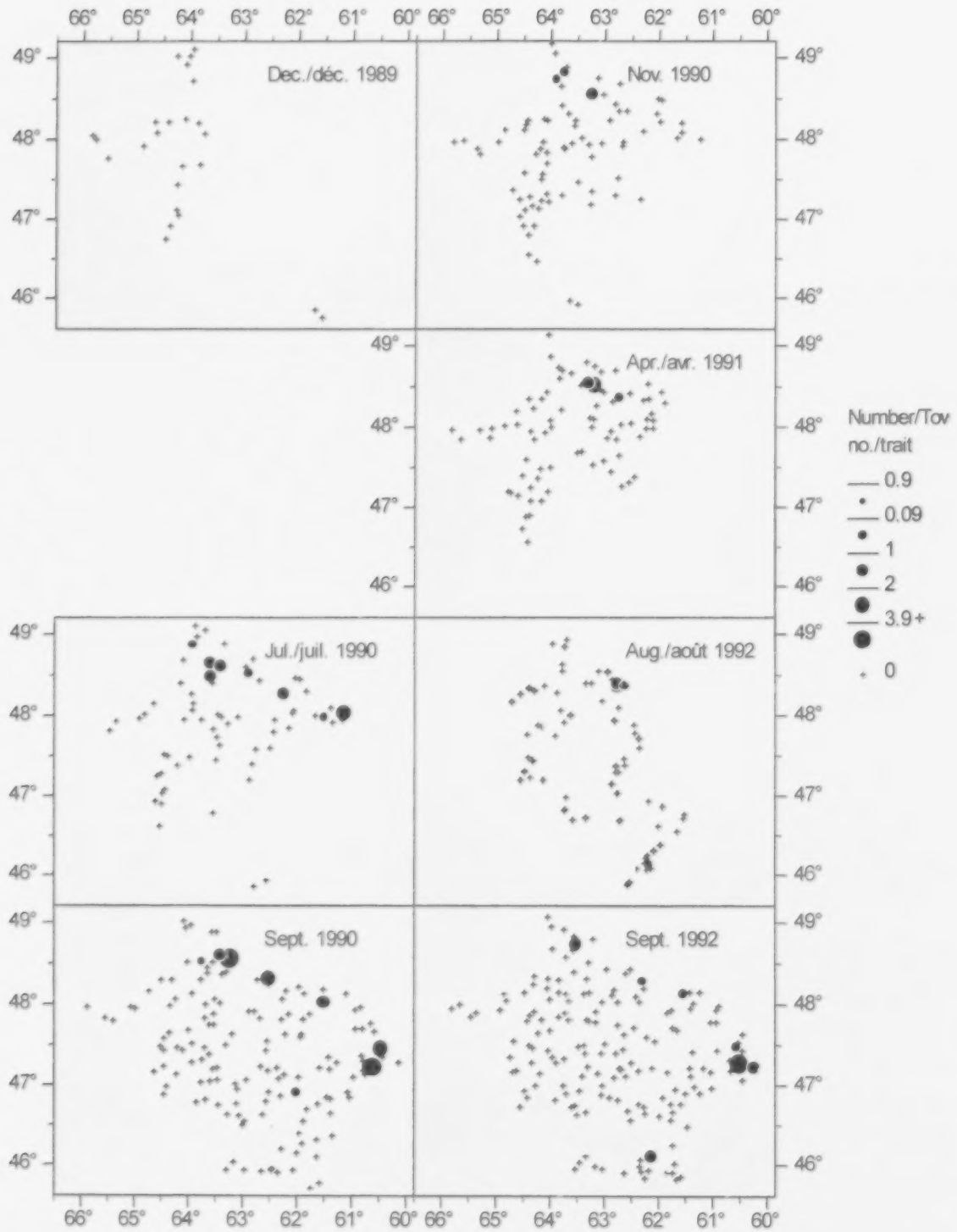

Figure 19d. S.W. Gulf of St. Lawrence seasonal distribution of catches (#/tow) of Atlantic Wolffish, *Anarhichas lupus*

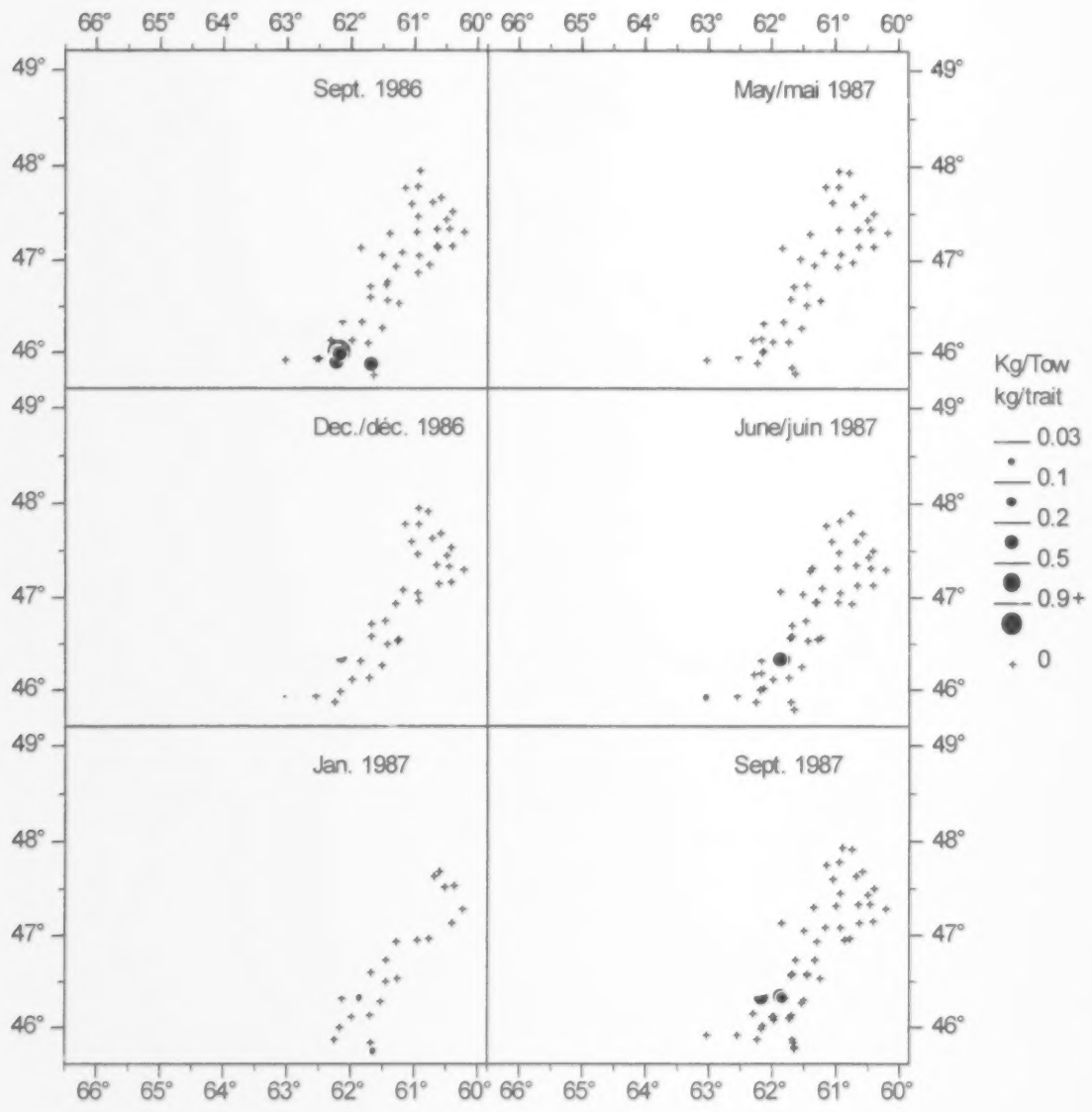

Figure 20a. S.E. Gulf of St. Lawrence seasonal distribution of catches (kg/tow) of Wrymouth, *Cryptocanthodes maculatus*

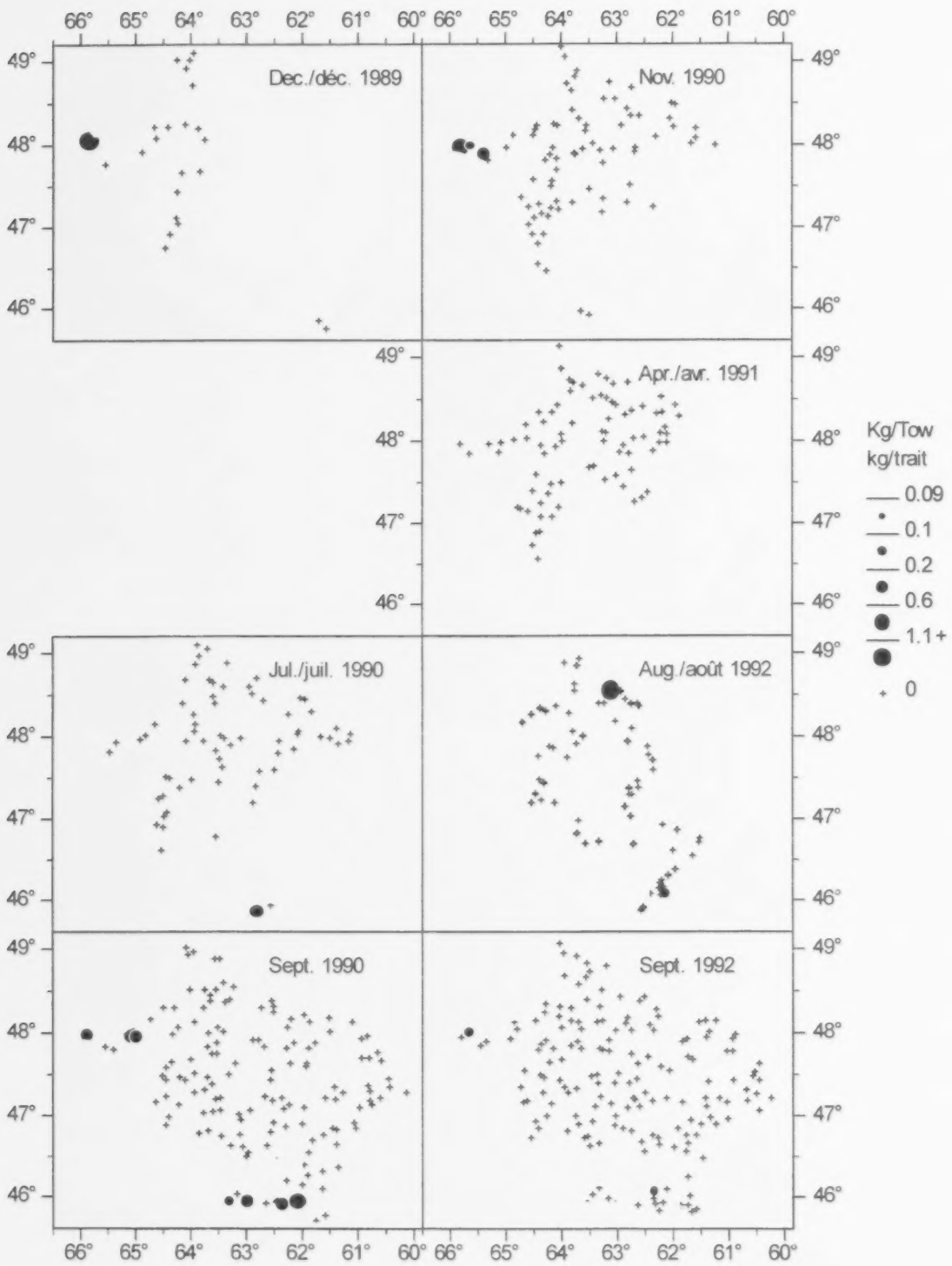

Figure 20b. S.W. Gulf of St. Lawrence seasonal distribution of catches (kg/tow) of Wrymouth, *Cryptocanthodes maculatus*

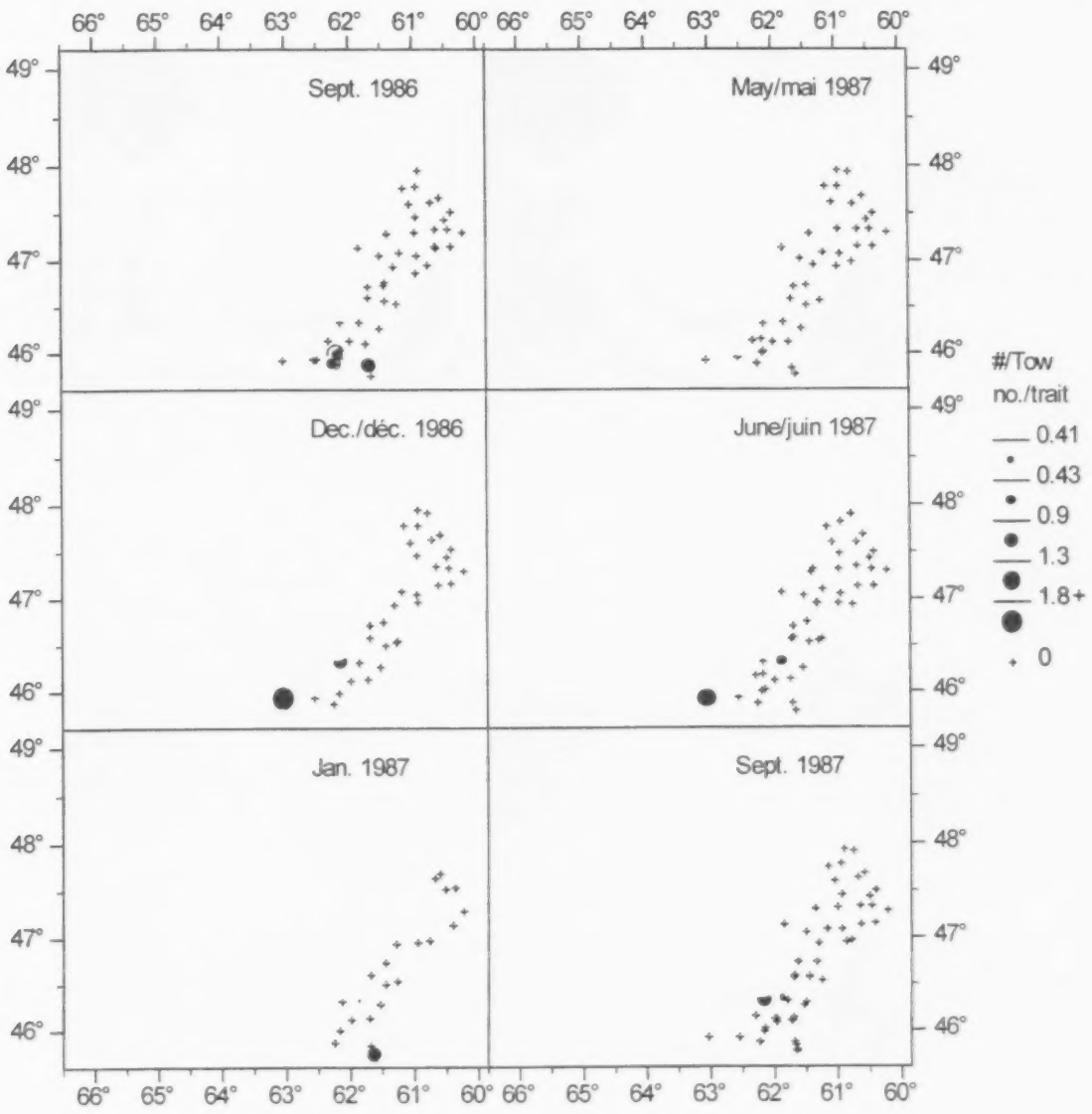

Figure 20c. S.E. Gulf of St. Lawrence seasonal distribution of catches (#/tow) of Wrymouth, *Cryptacanthodes maculatus*

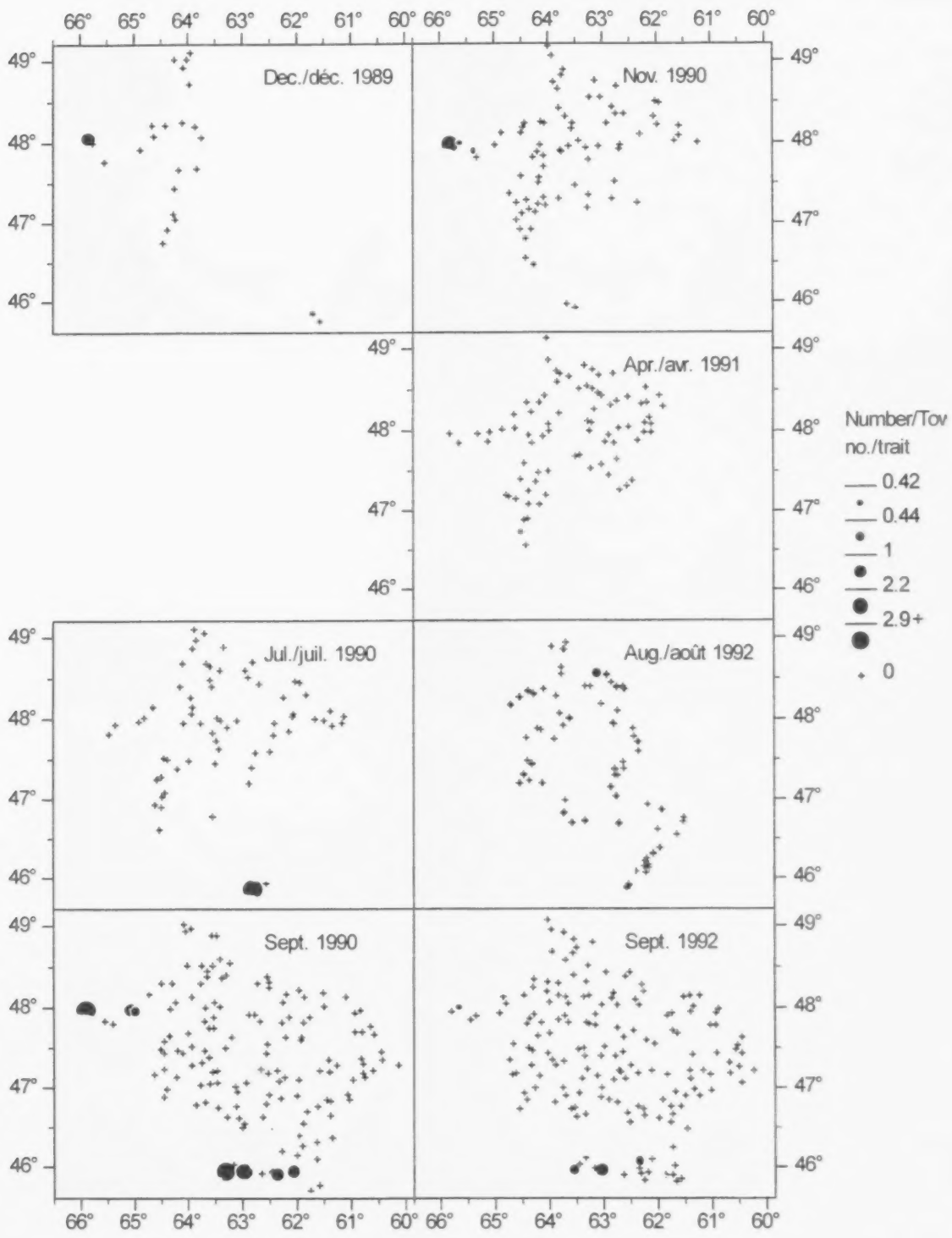

Figure 20d. S.W. Gulf of St. Lawrence seasonal distribution of catches (#/tow) of Wrymouth, *Cryptacanthodes maculatus*

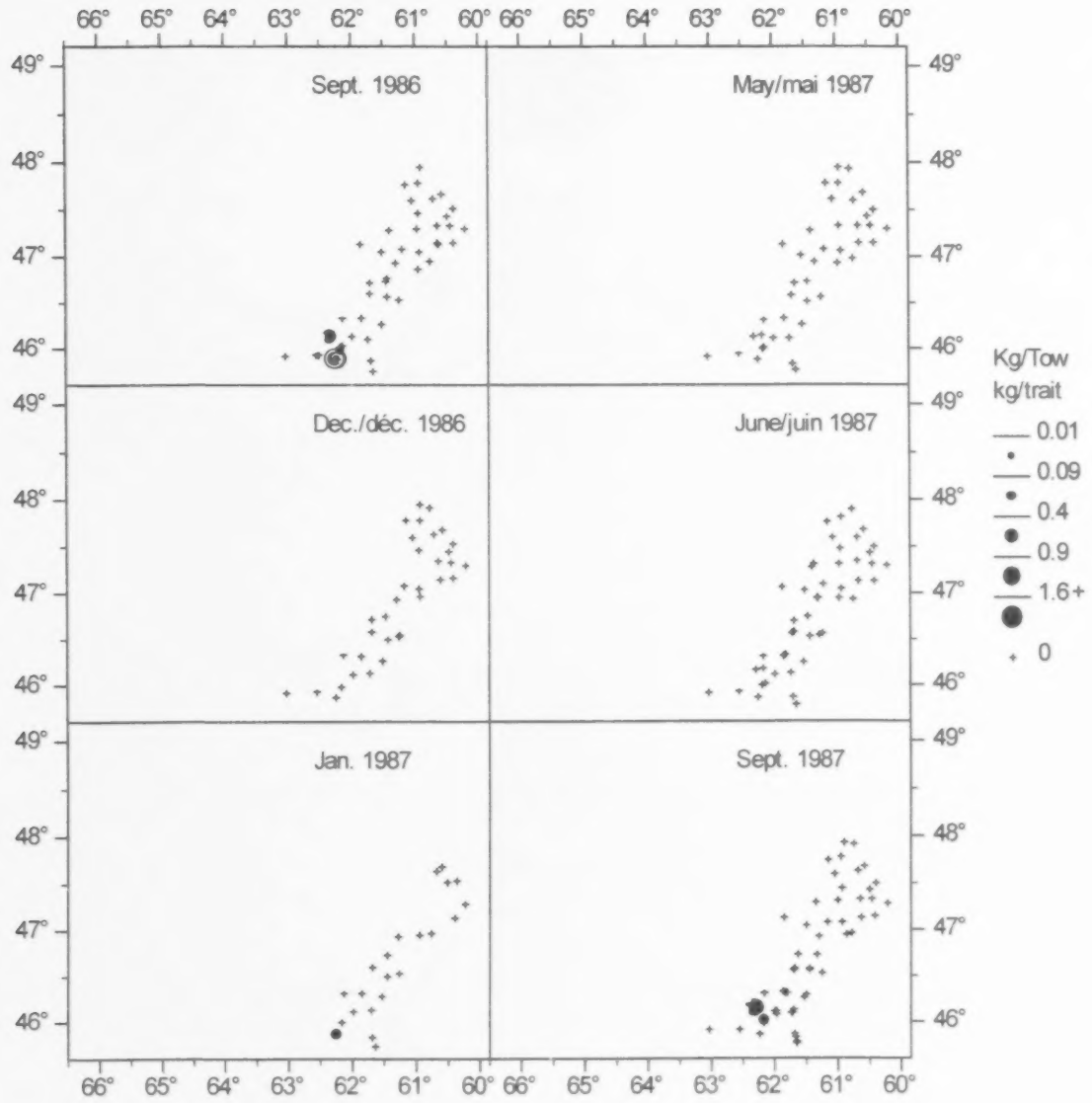

Figure 21a. S.E. Gulf of St. Lawrence seasonal distribution of catches (kg/tow) of Cunner, *Tautogolabrus adspersus*

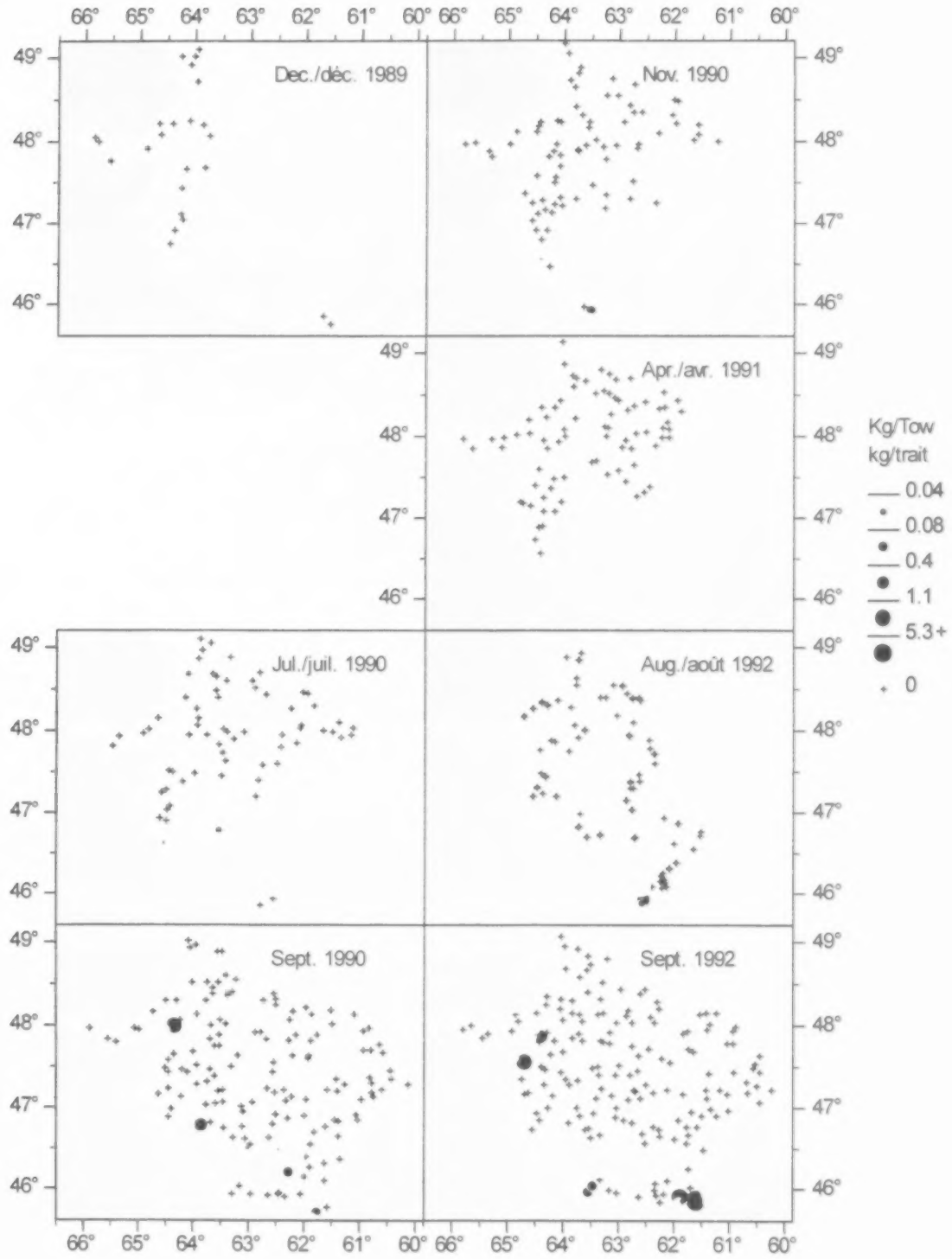

Figure 21b. S.W. Gulf of St. Lawrence seasonal distribution of catches (kg/tow) of Cunner, *Tautogolabrus adspersus*

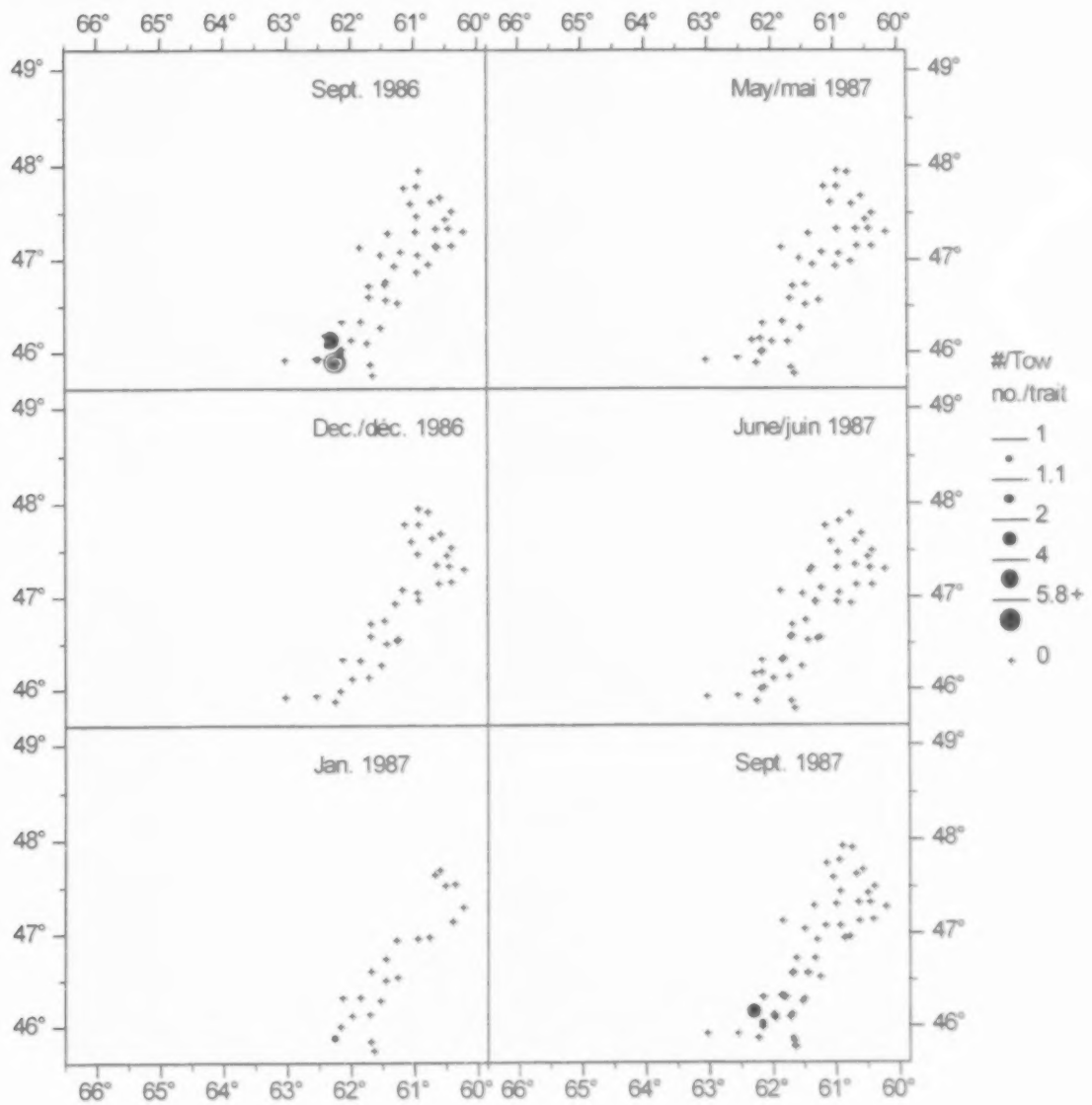

Figure 21c. S.E. Gulf of St. Lawrence seasonal distribution of catches (#/tow) of Cunner, *Tautogolabrus adspersus*

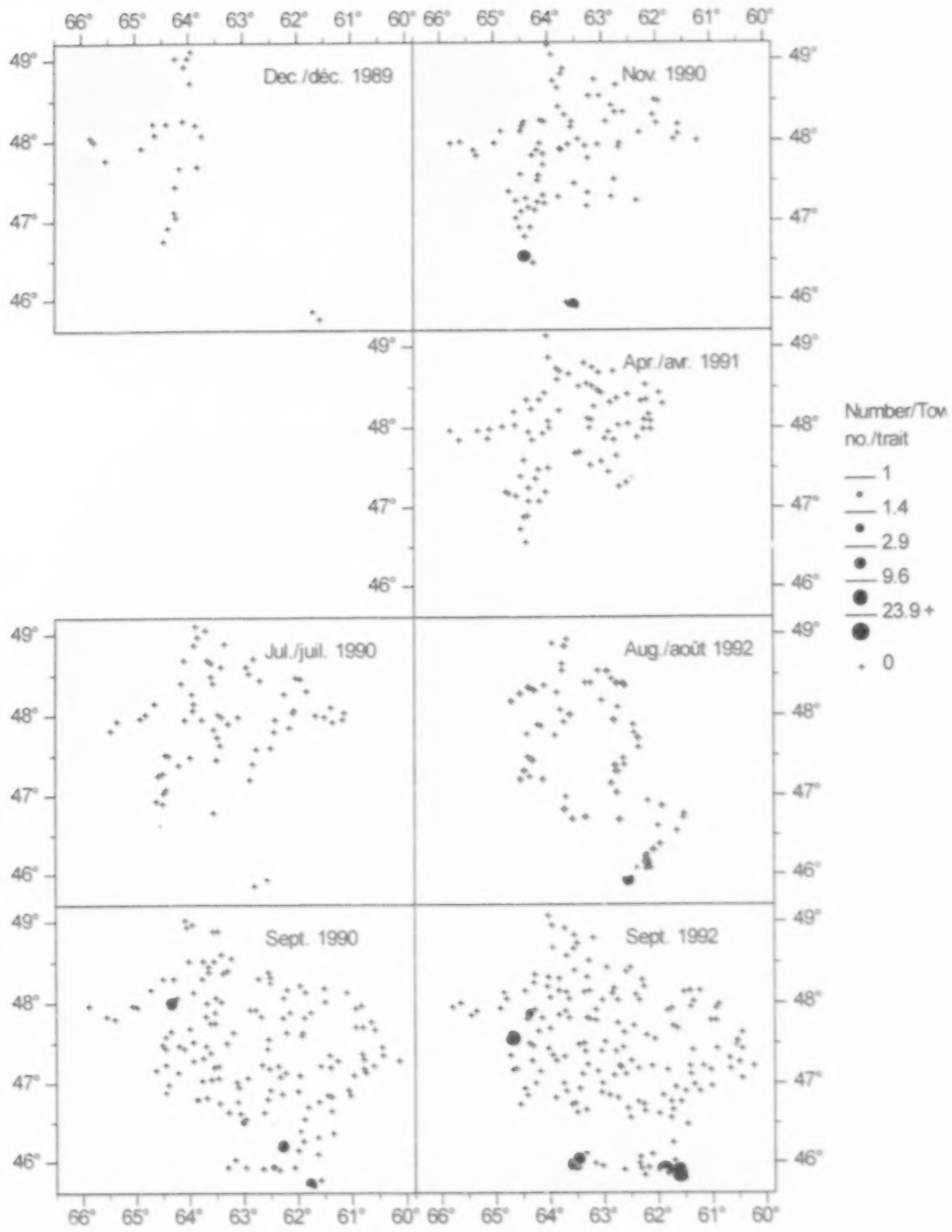

Figure 21d. S.W. Gulf of St. Lawrence seasonal distribution of catches (#/tow) of Cunner, *Tautogolabrus adspersus*

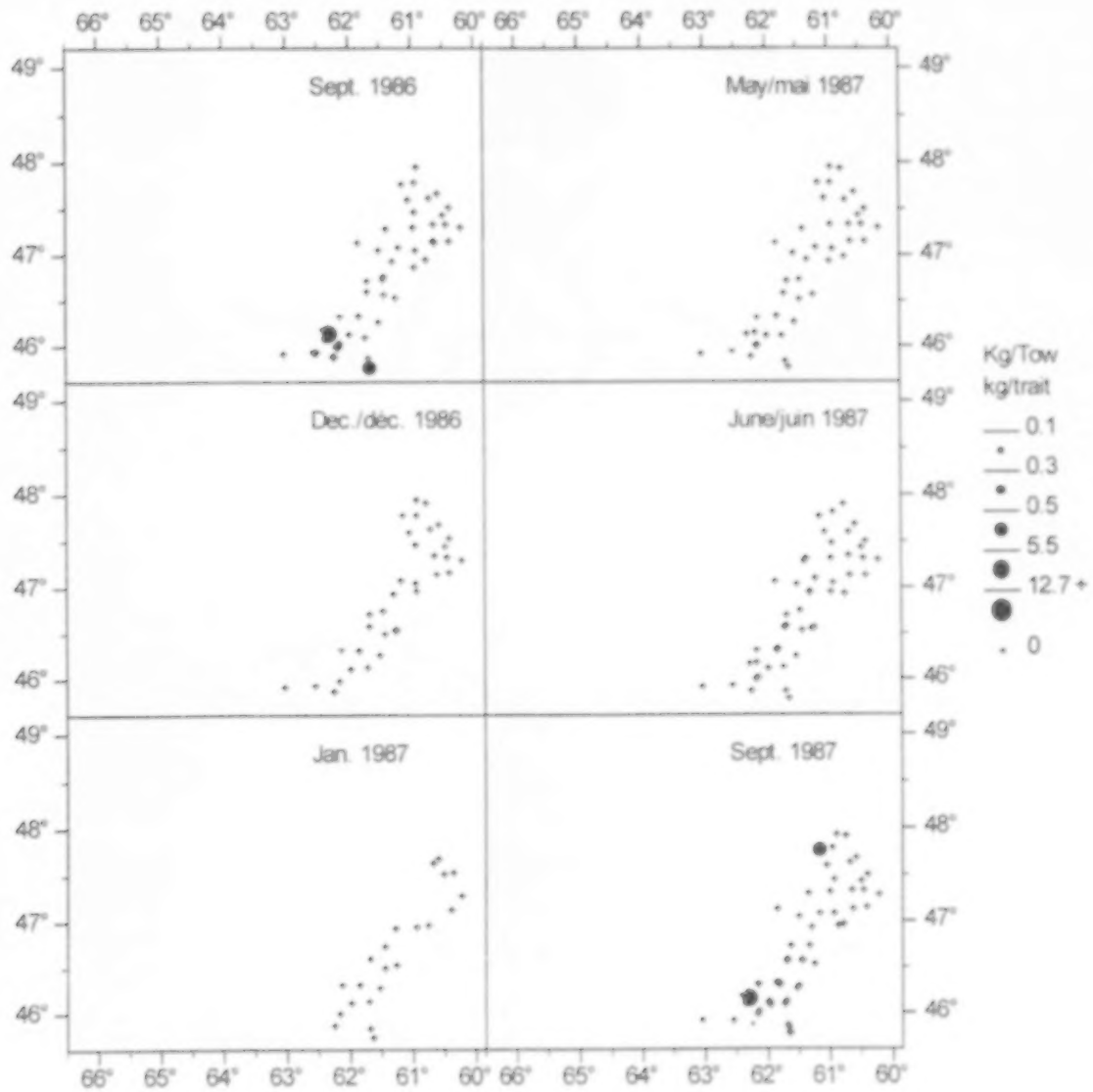

Figure 22a. S.E. Gulf of St. Lawrence seasonal distribution of catches (kg/tow) of Atlantic Mackerel, *Scomber scombrus*

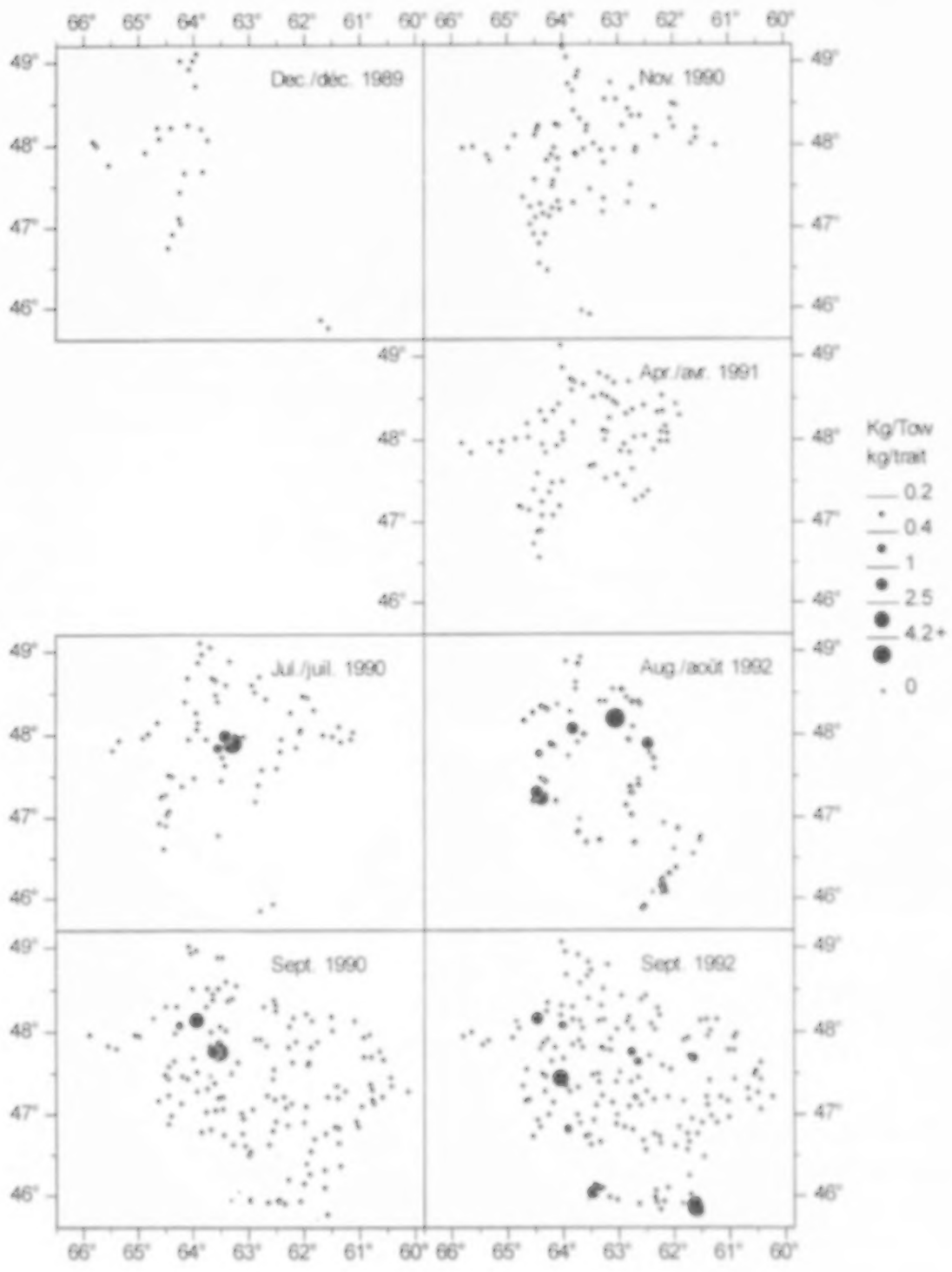

Figure 22b. S.W. Gulf of St. Lawrence seasonal distribution of catches (kg/tow) of Atlantic Mackerel, *Scomber scombrus*

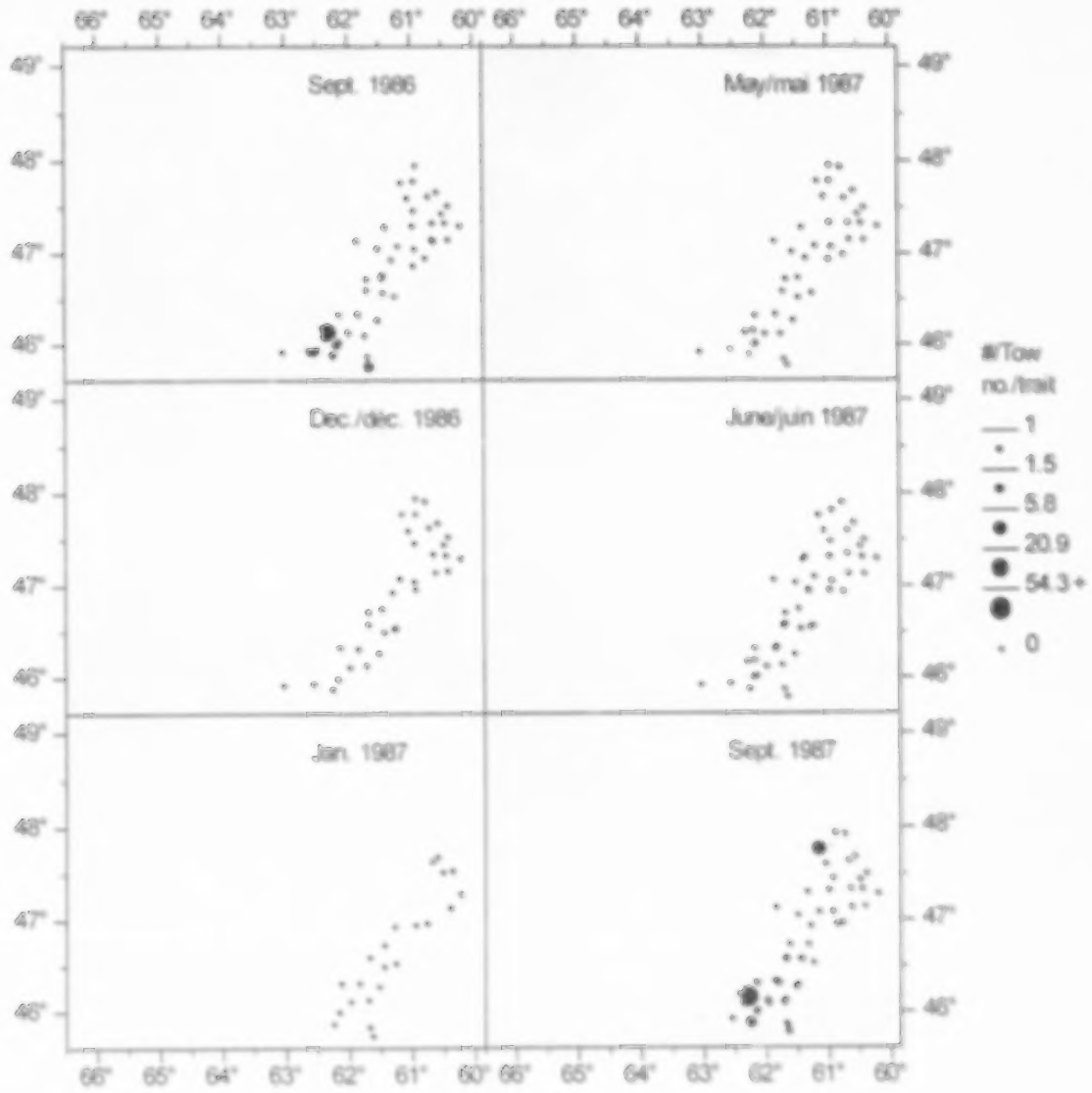

Figure 22c. S.E. Gulf of St. Lawrence seasonal distribution of catches (#/tow) of Atlantic Mackerel, *Scomber scombrus*

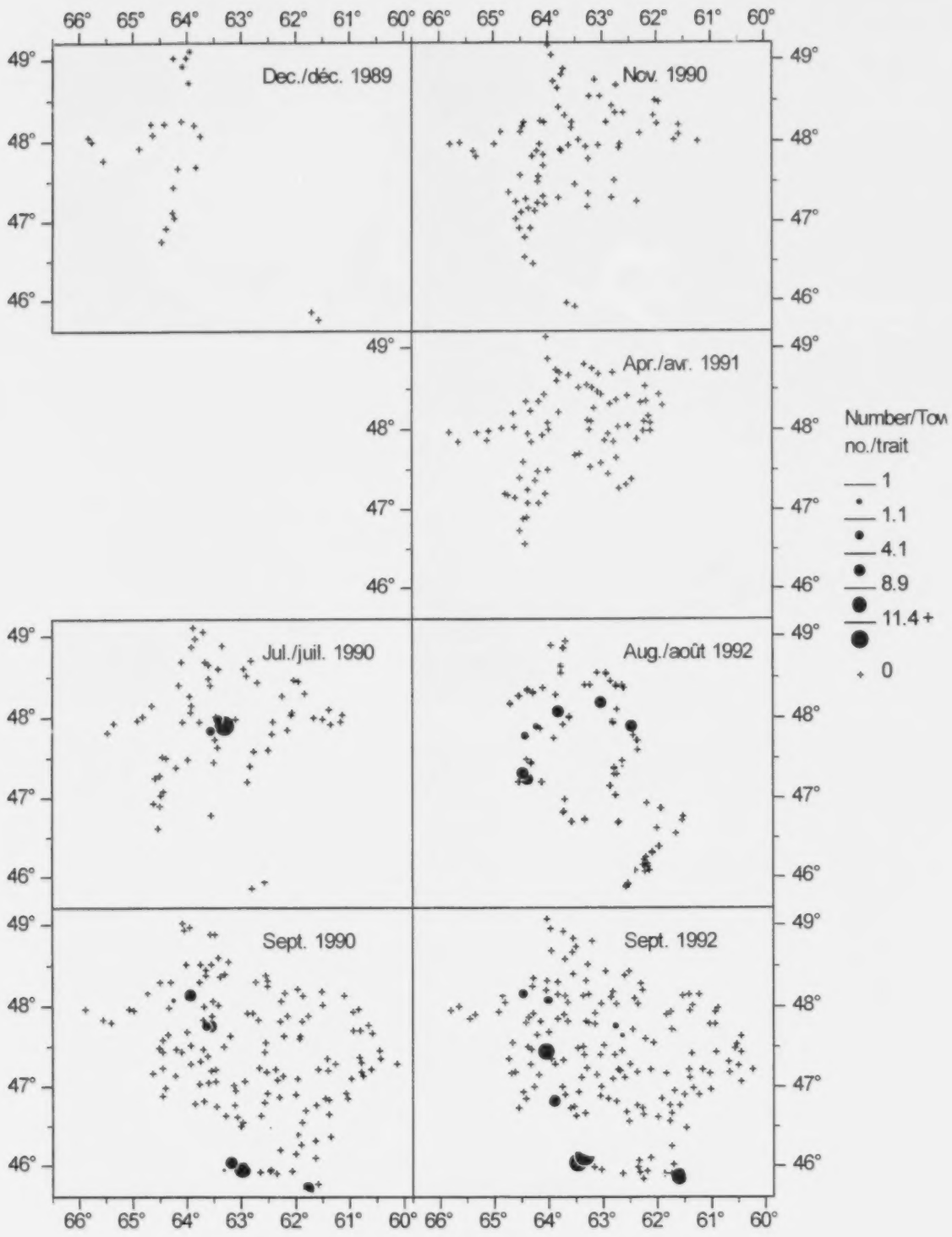

Figure 22d. S.W. Gulf of St. Lawrence seasonal distribution of catches (#/tow) of Atlantic Mackerel, *Scomber scombrus*

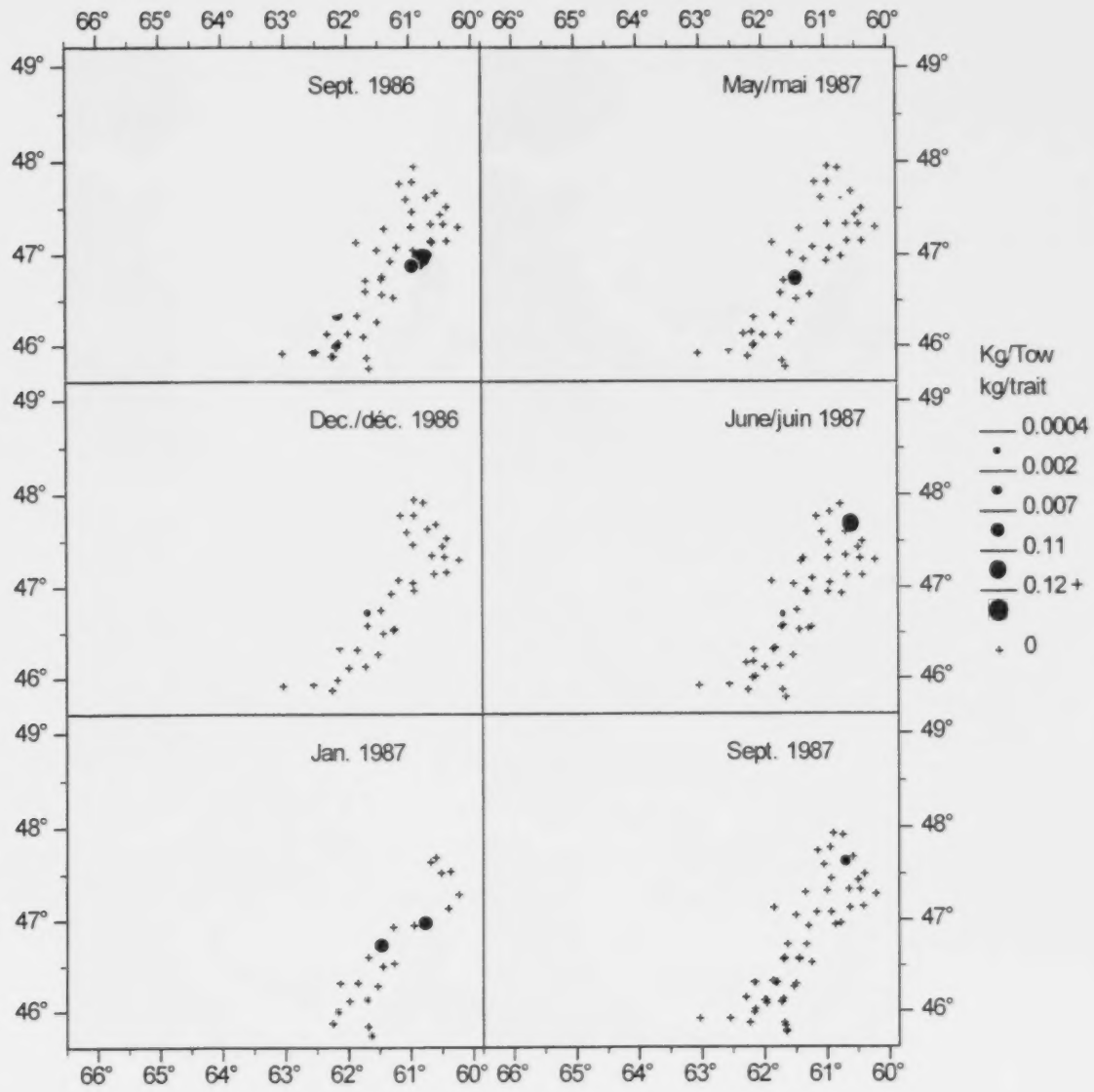

Figure 23a. S.E. Gulf of St. Lawrence seasonal distribution of catches (kg/tow) of Fourline Snakeblenny, *Eumesogrammus praecisus*

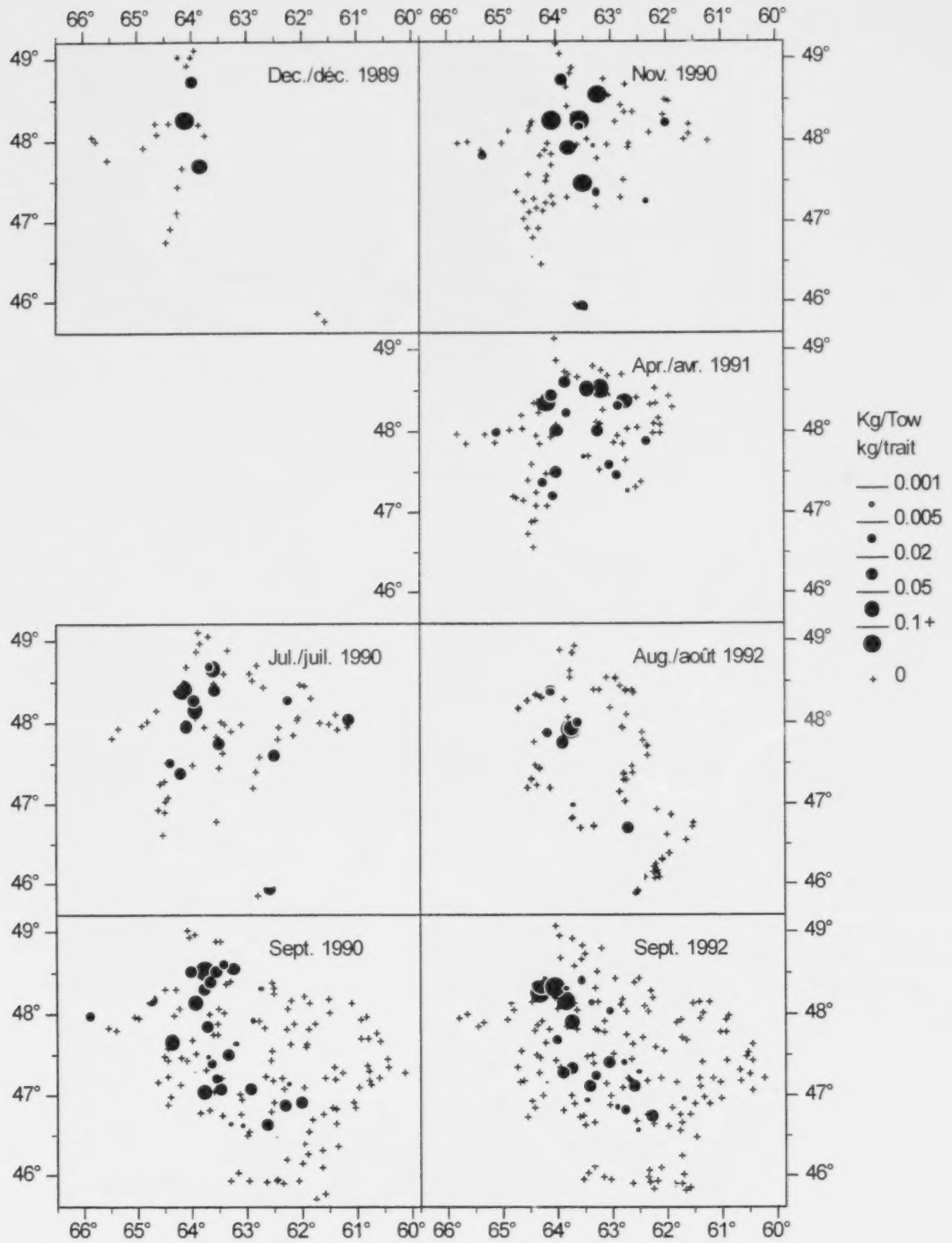

Figure 23b. S.W. Gulf of St. Lawrence seasonal distribution of catches (kg/tow) of Fourline Snakeblenny, *Eumesogrammus praecisus*

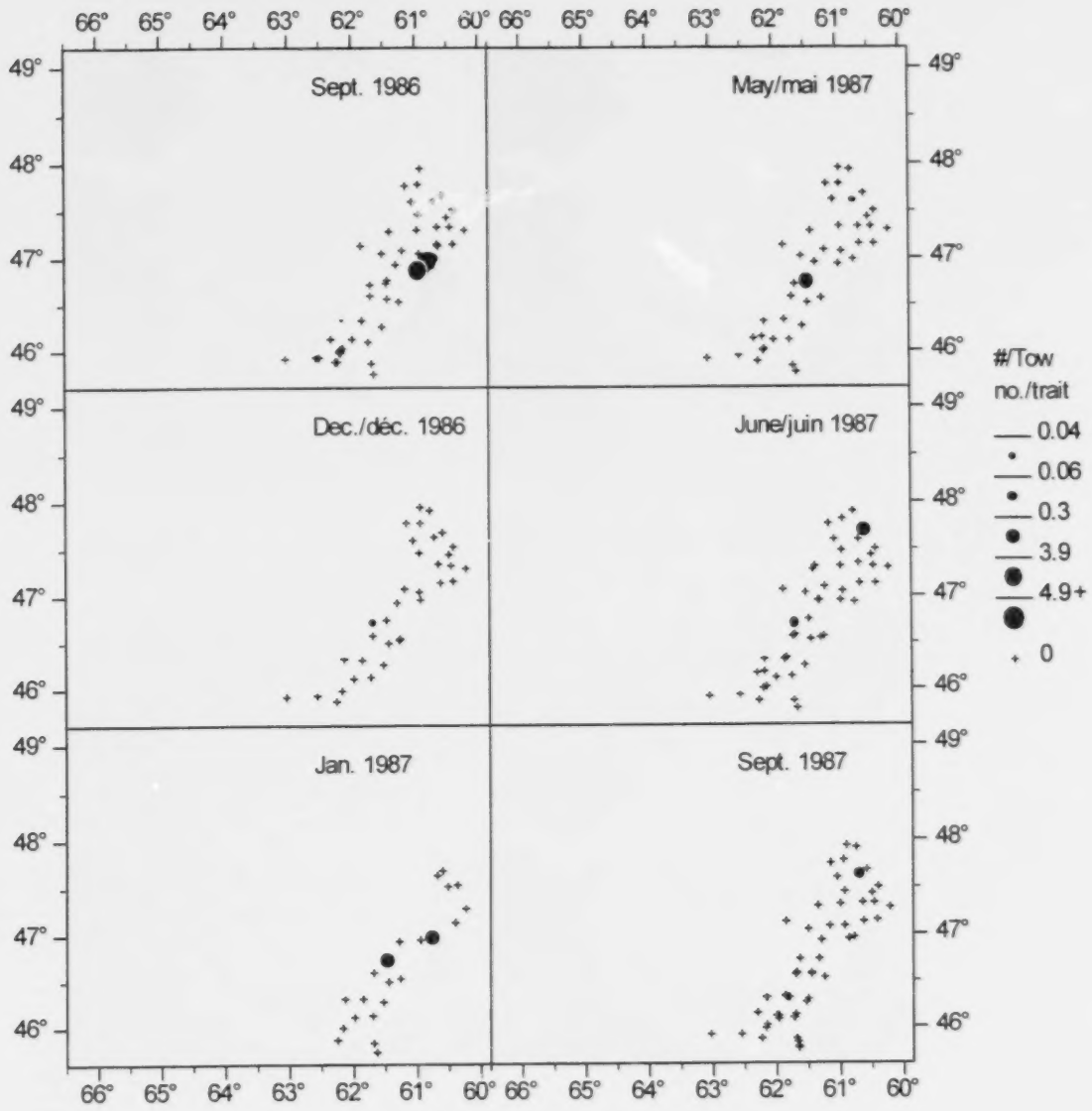

Figure 23c. S.E. Gulf of St. Lawrence seasonal distribution of catches (#/tow) of Fourline Snakeblenny, *Eumesogrammus praecisus*

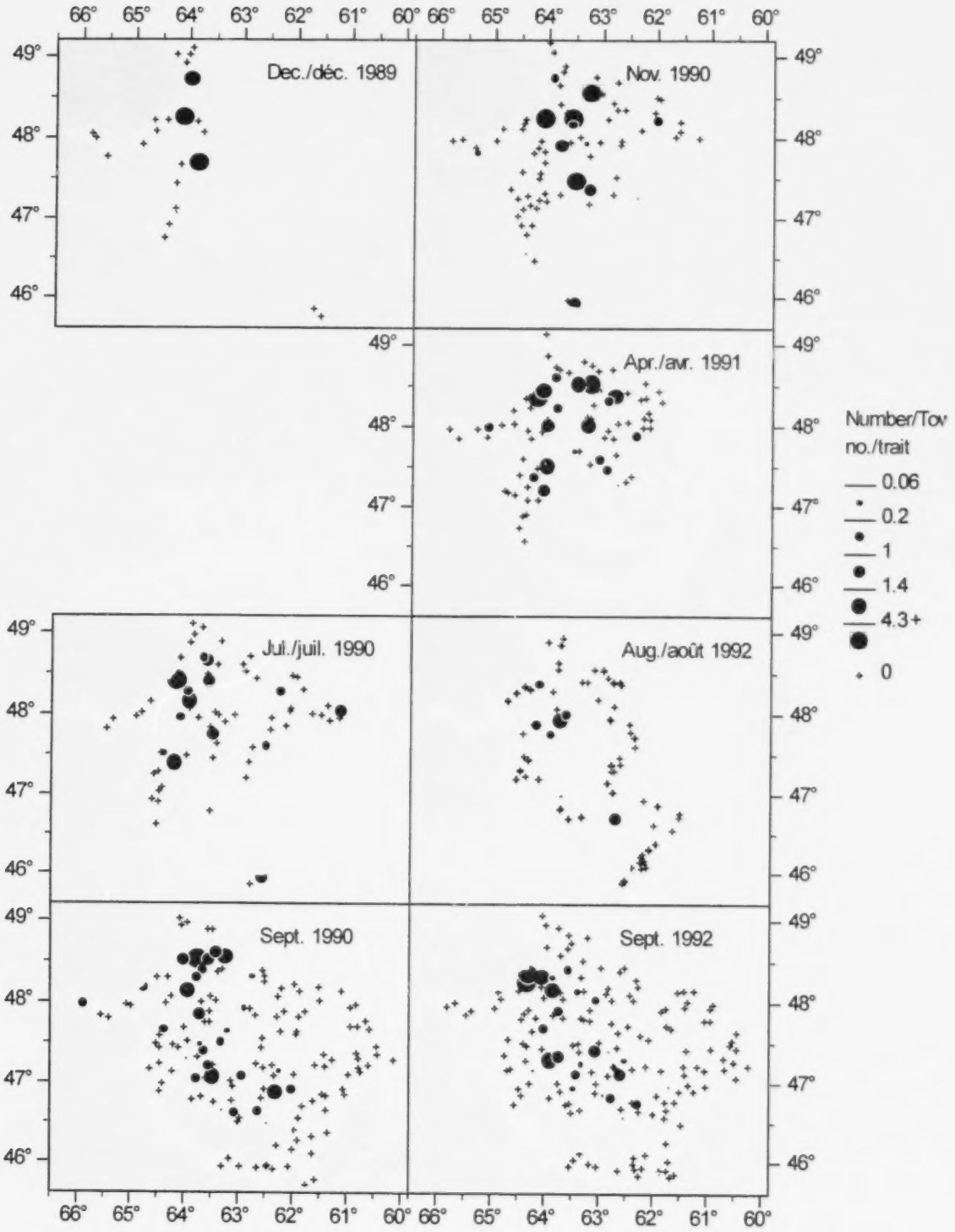

Figure 23d. S.W. Gulf of St. Lawrence seasonal distribution of catches (#/tow) of Fourline Snakeblenny, *Eumesogrammus praecisus*

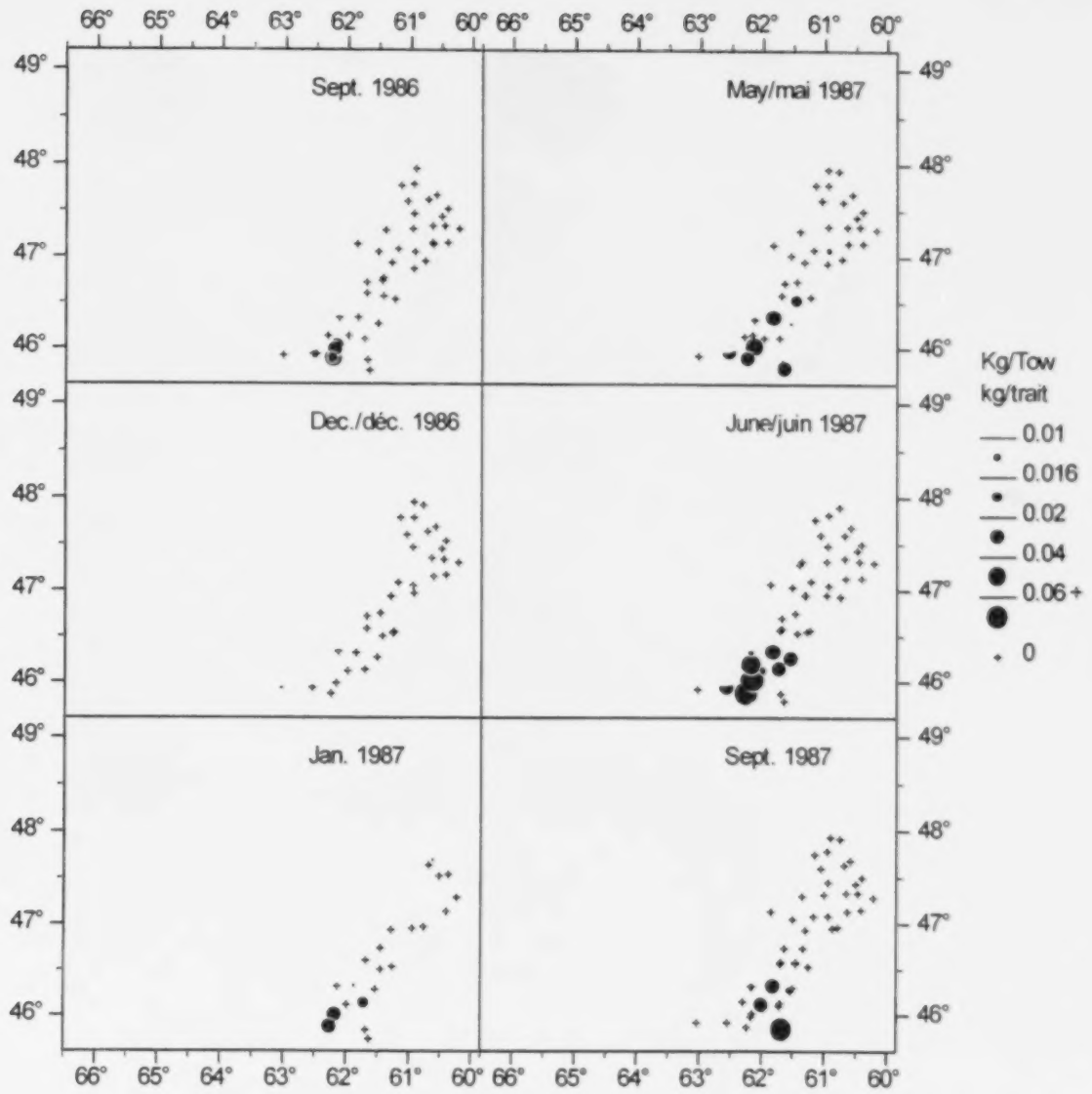

Figure 24a. S.E. Gulf of St. Lawrence seasonal distribution of catches (kg/tow) of Snakeblenny, *Lumpenus lampretaeformis*

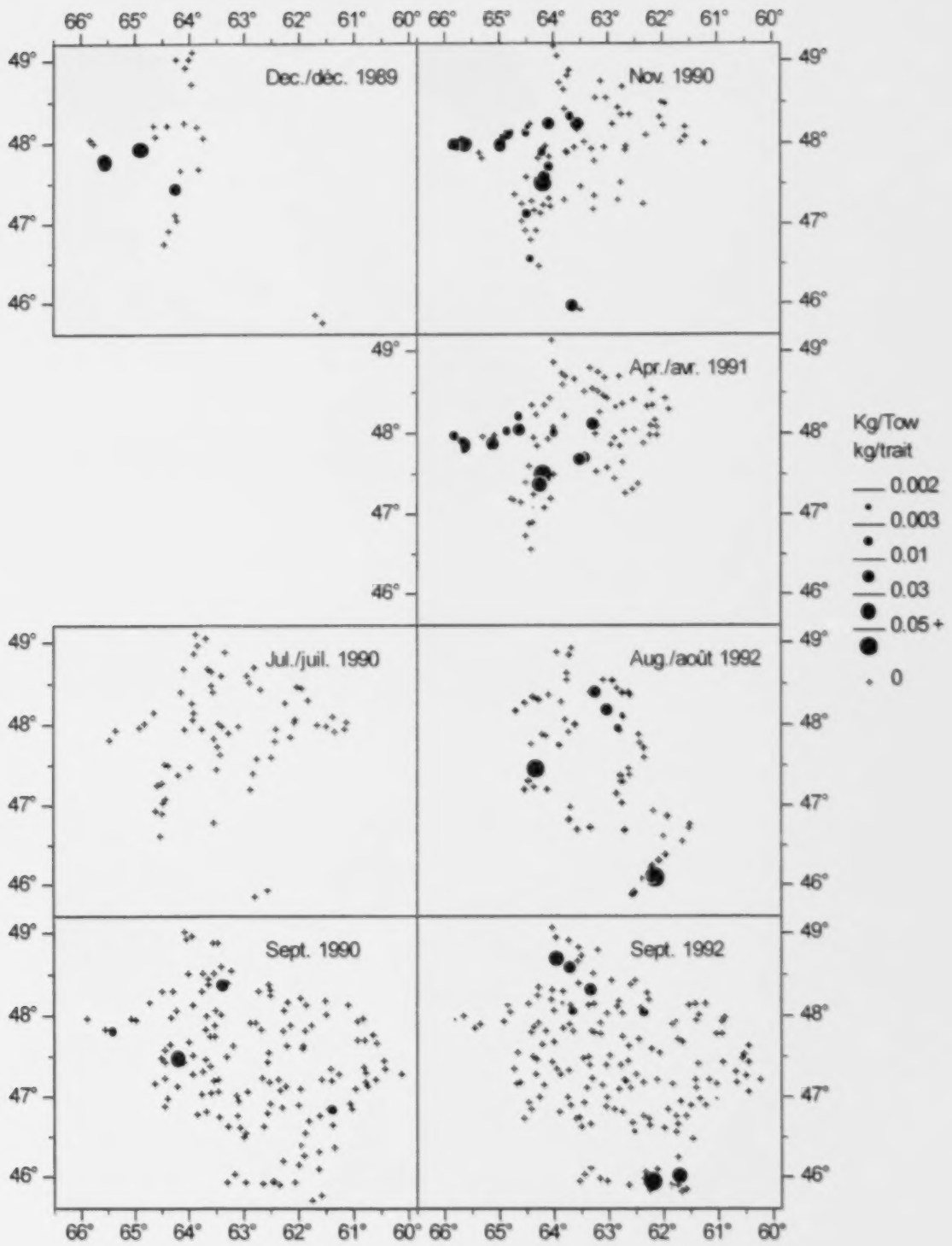

Figure 24b. S.W. Gulf of St. Lawrence seasonal distribution of catches (kg/tow) of Snakeblenny, *Lumpenus lampretaeformis*

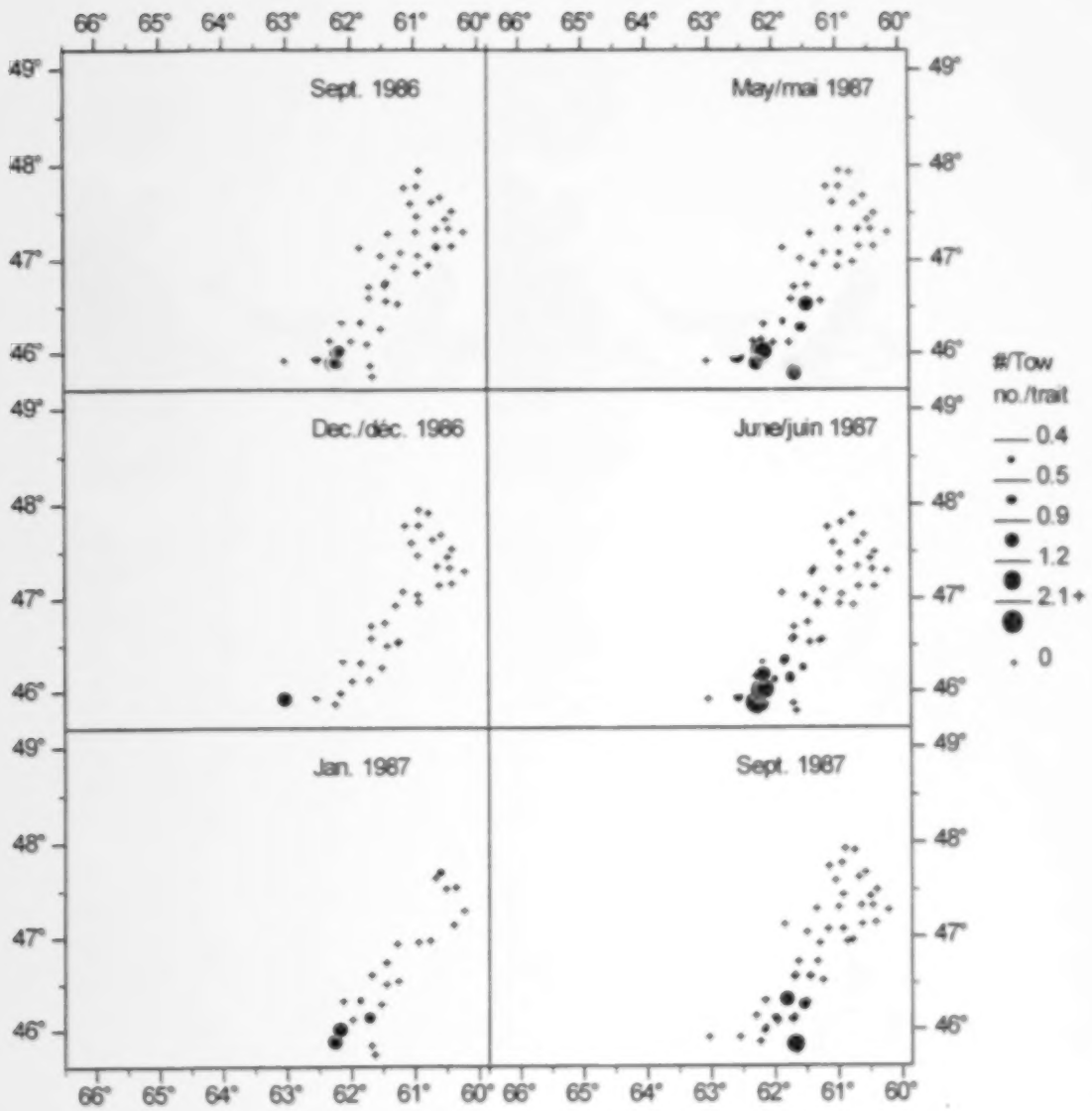

Figure 24c. S.E. Gulf of St. Lawrence seasonal distribution of catches (#/tow) of Snakeblenny, *Lumpenus lampretaeformis*

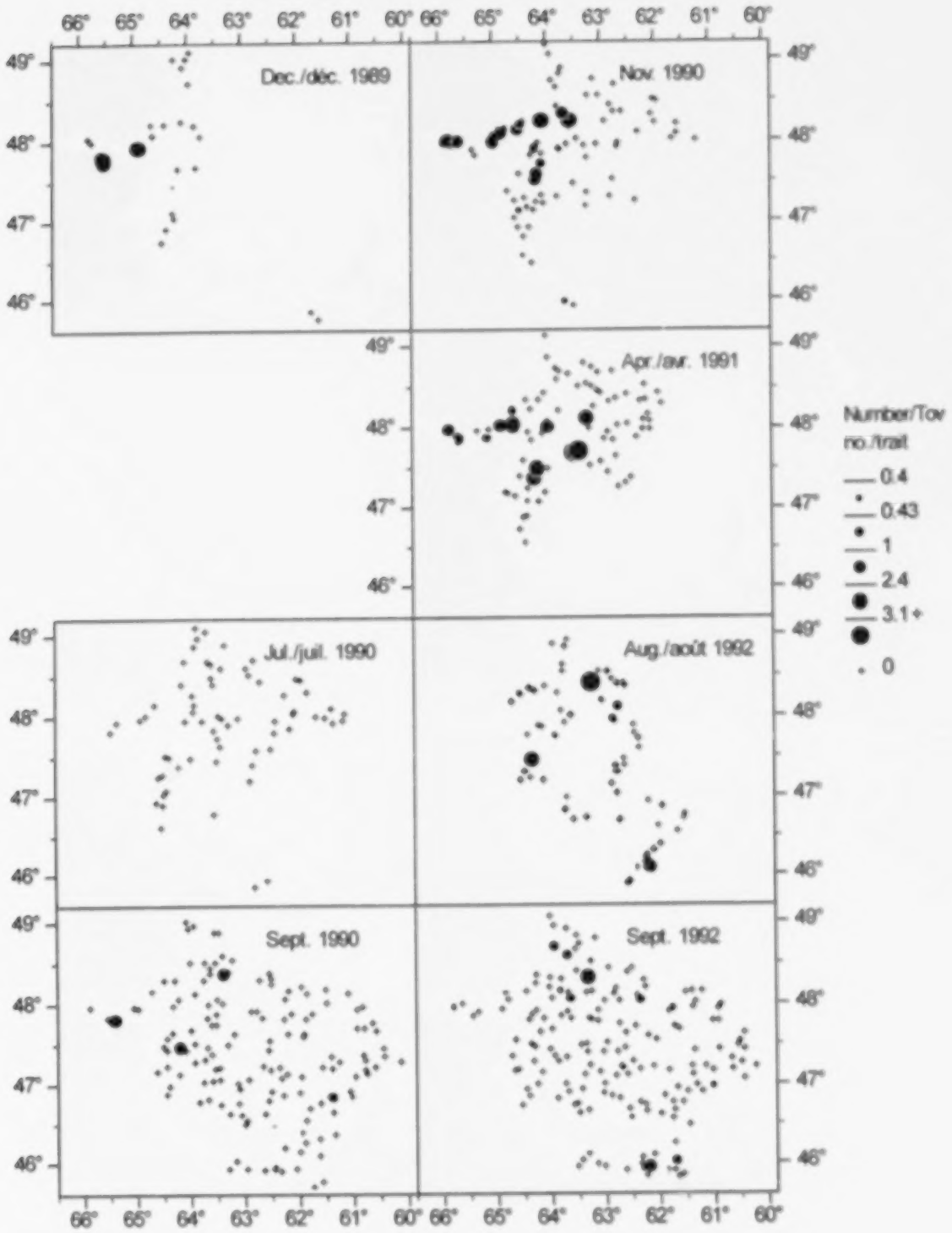

Figure 24d. S.W. Gulf of St. Lawrence seasonal distribution of catches (#/tow) of Snakeblenny, *Lumpenus lampretaeformis*

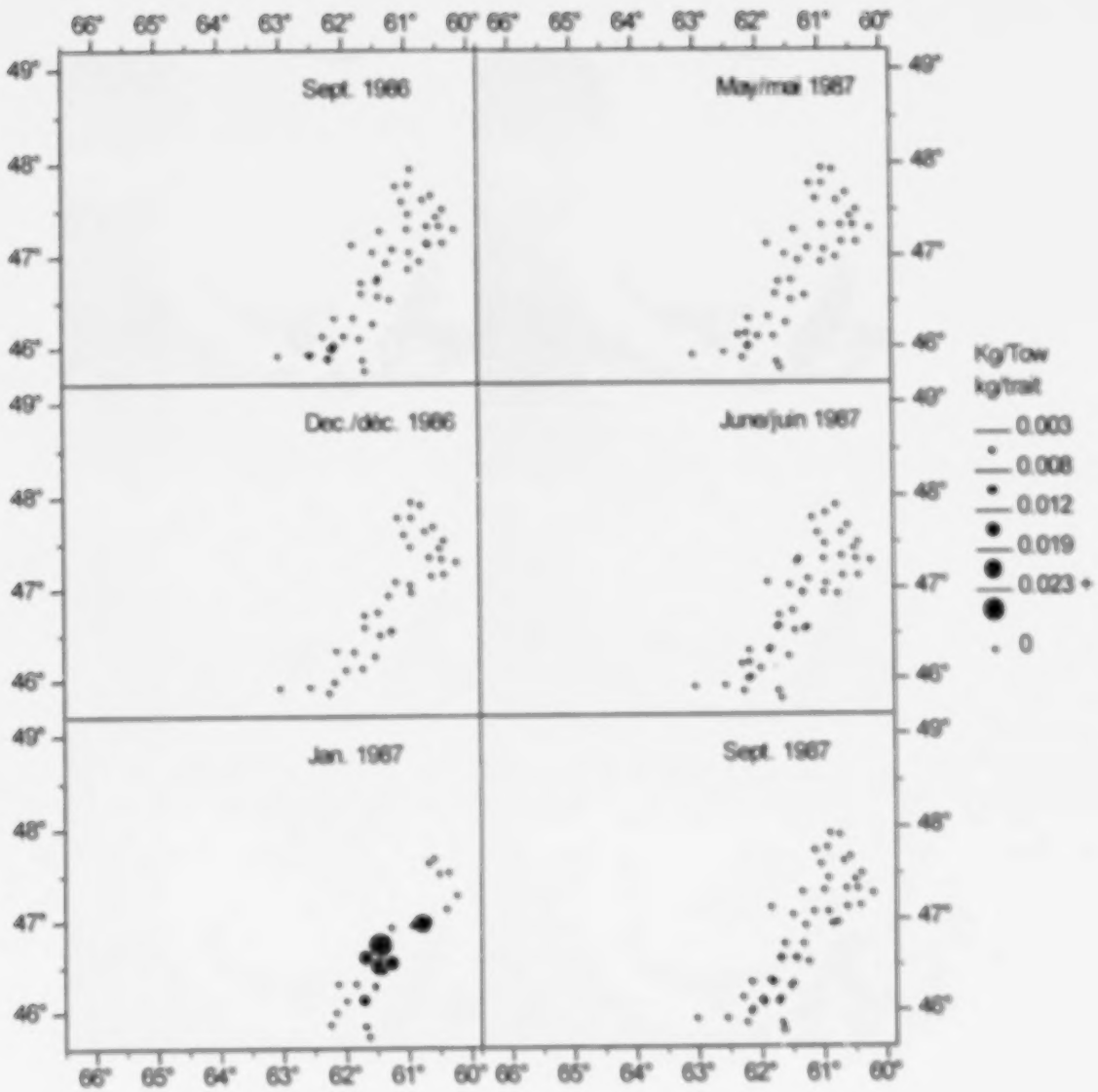

Figure 25a. S.E. Gulf of St. Lawrence seasonal distribution of catches (kg/tow) of Daubed Shanny, *Leptoclinus maculatus*

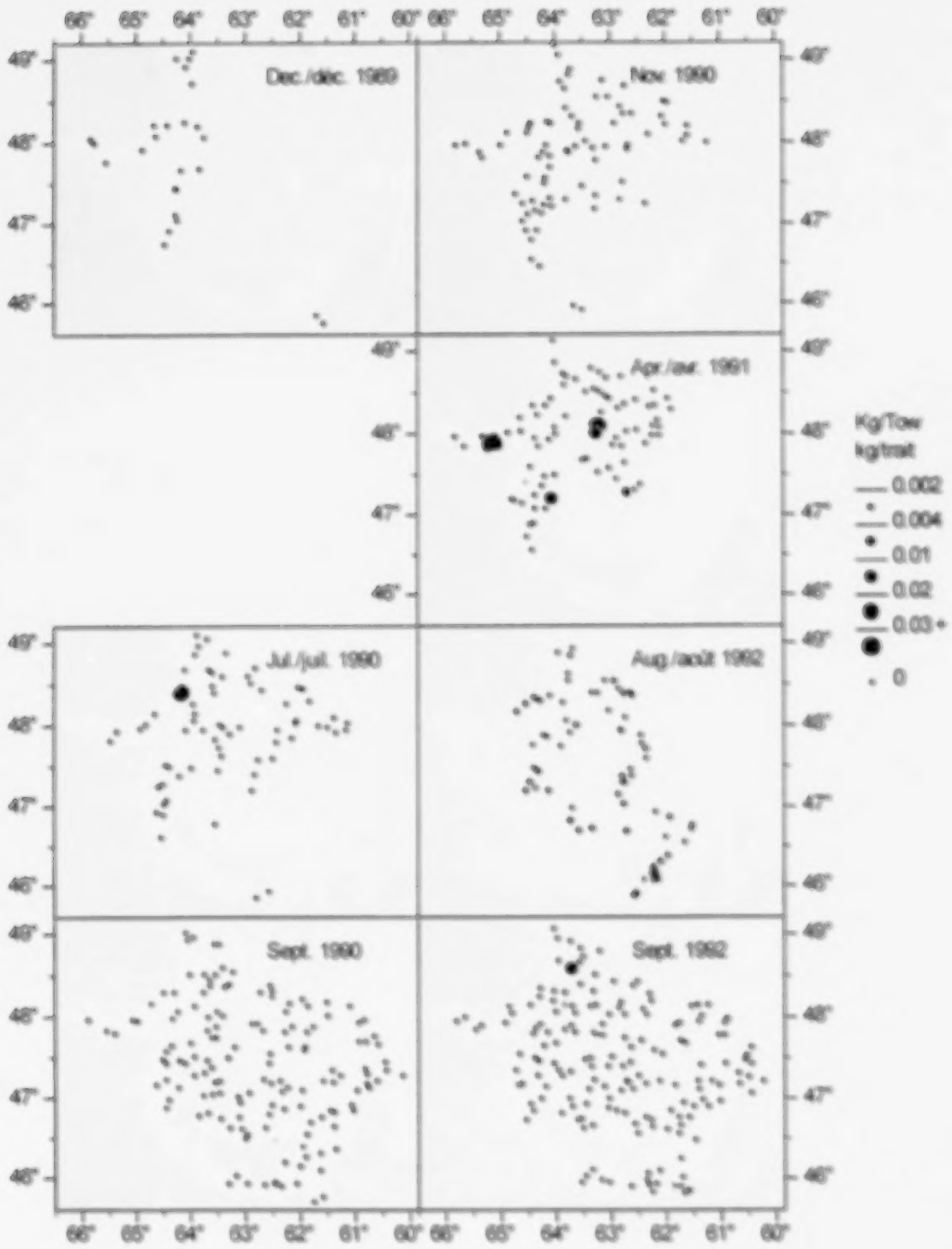

Figure 25b. S.W. Gulf of St. Lawrence seasonal distribution of catches (kg/tow) of Daubed Shanny, *Leptoclinus maculatus*

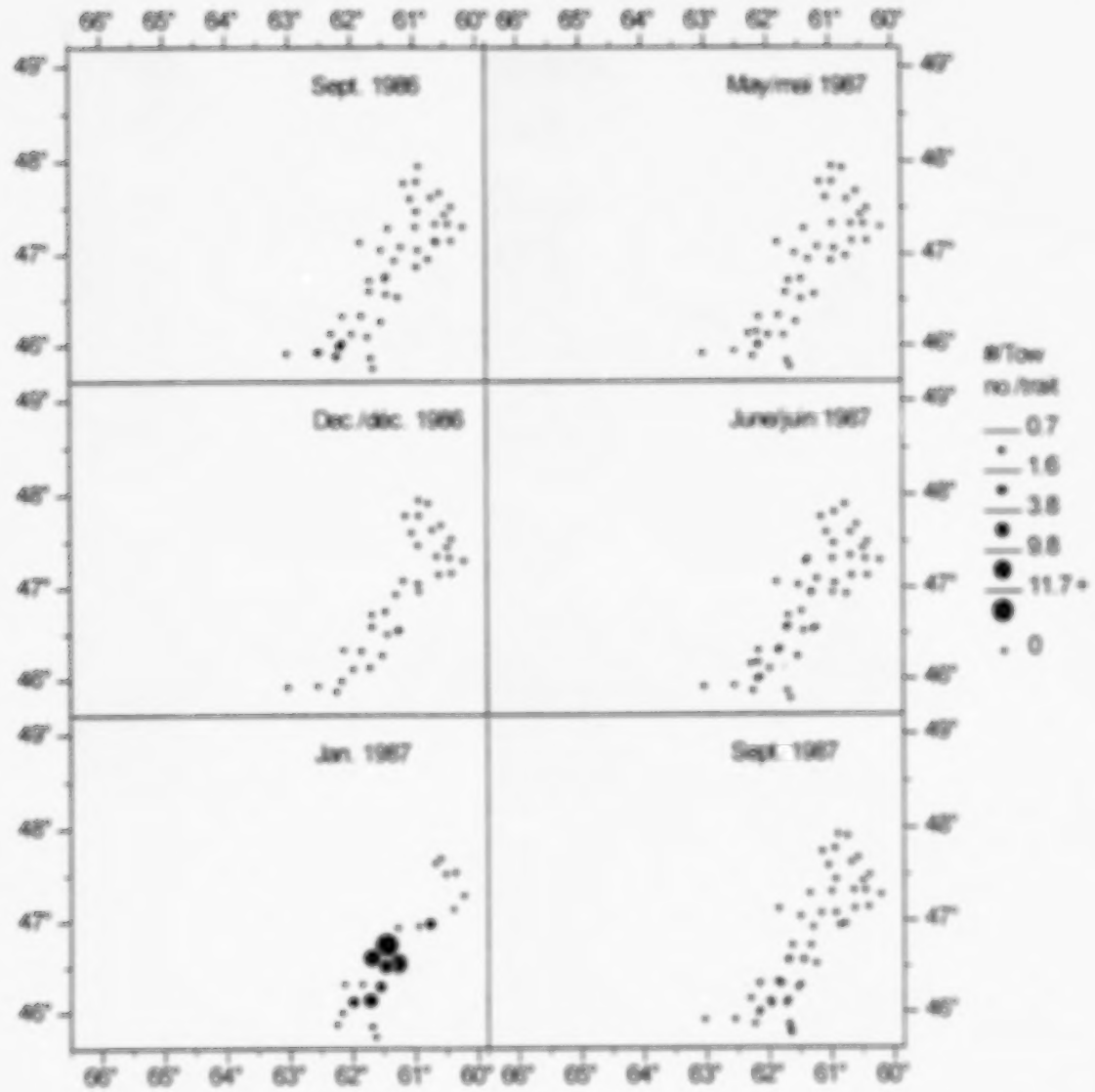

Figure 25c. S.E. Gulf of St. Lawrence seasonal distribution of catches (#/tow) of Daubed Shanny, Leptoclinus maculatus

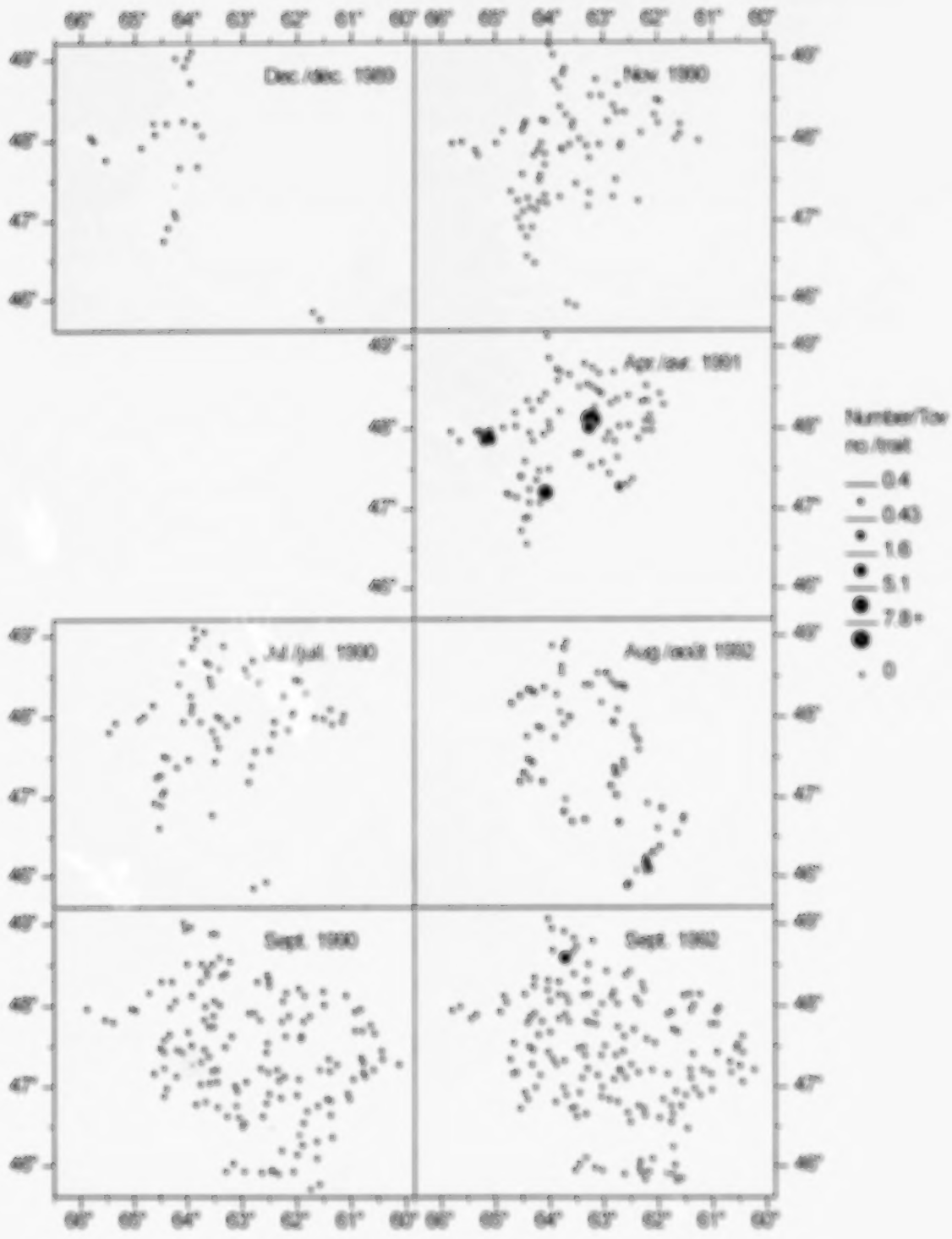

Figure 25d. S.W. Gulf of St. Lawrence seasonal distribution of catches (#/tow) of Daubed Shanny, *Leptoclinus maculatus*

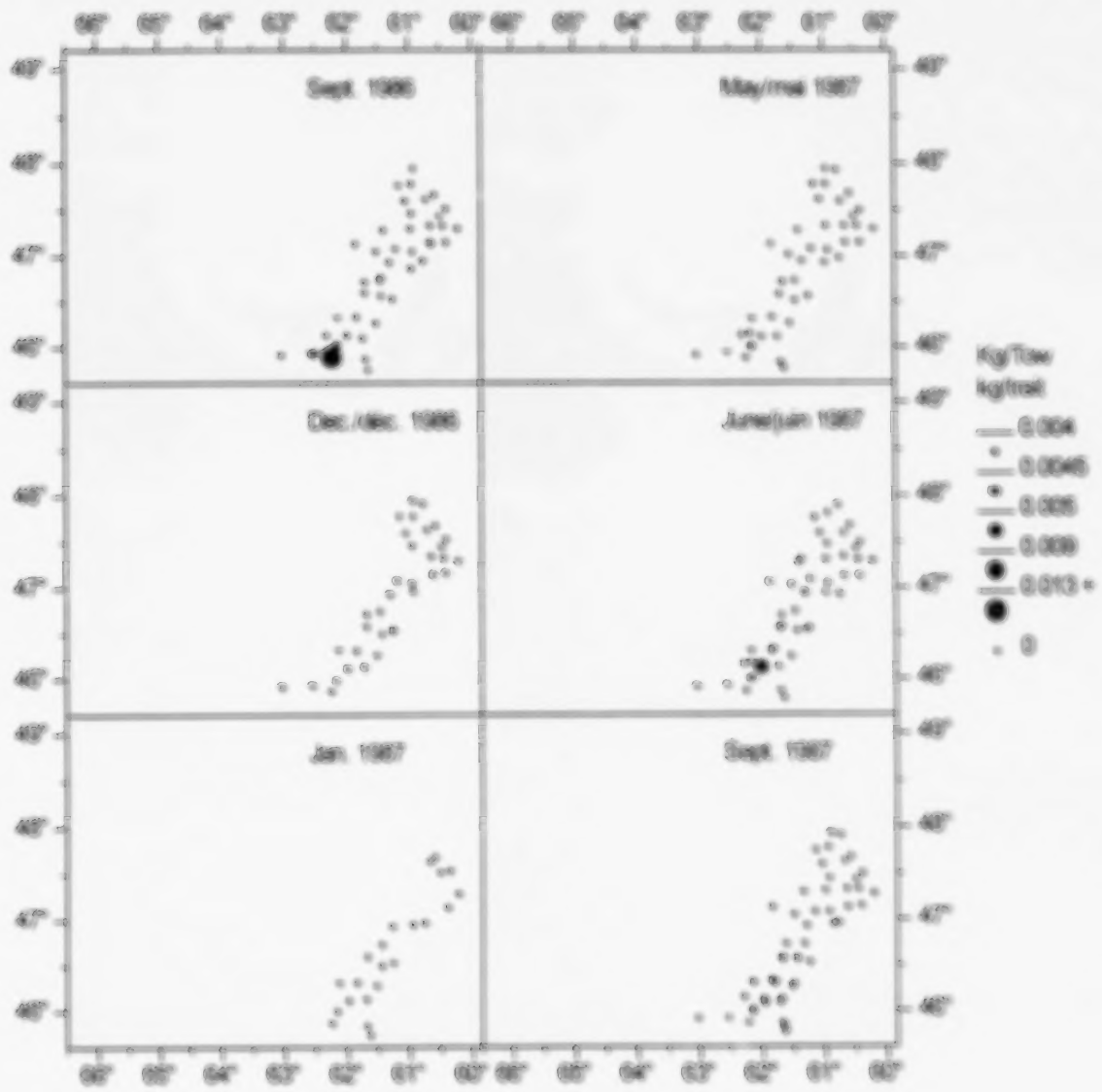

Figure 28a. S.E. Gulf of St. Lawrence seasonal distribution of catches (kg/tow) of Radiated Shanny, *Ulvaria subbifurcata*

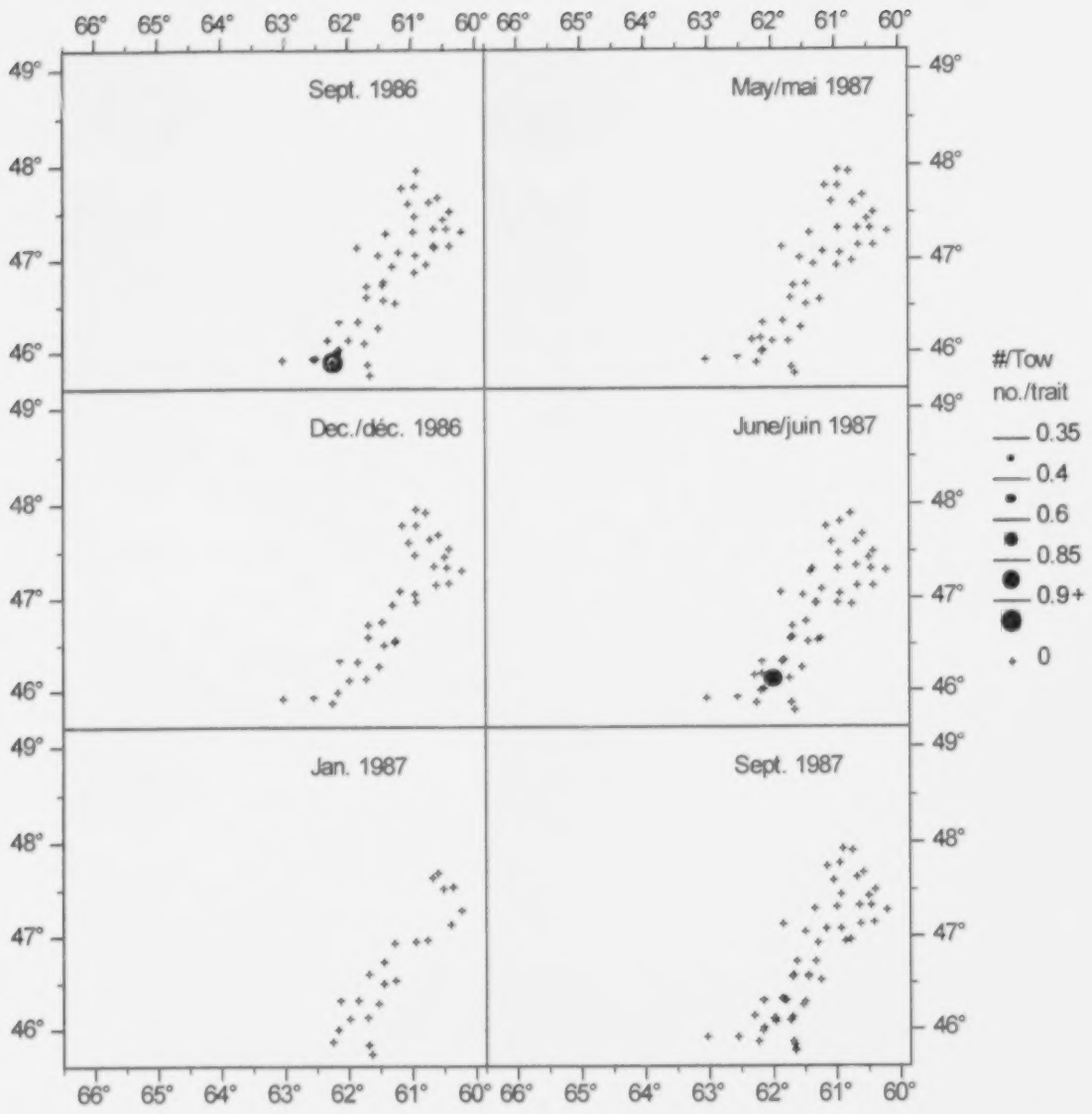

Figure 26b. S.E. Gulf of St. Lawrence seasonal distribution of catches (#/tow) of Radiated Shanny, *Ulvaria subbifurcata*

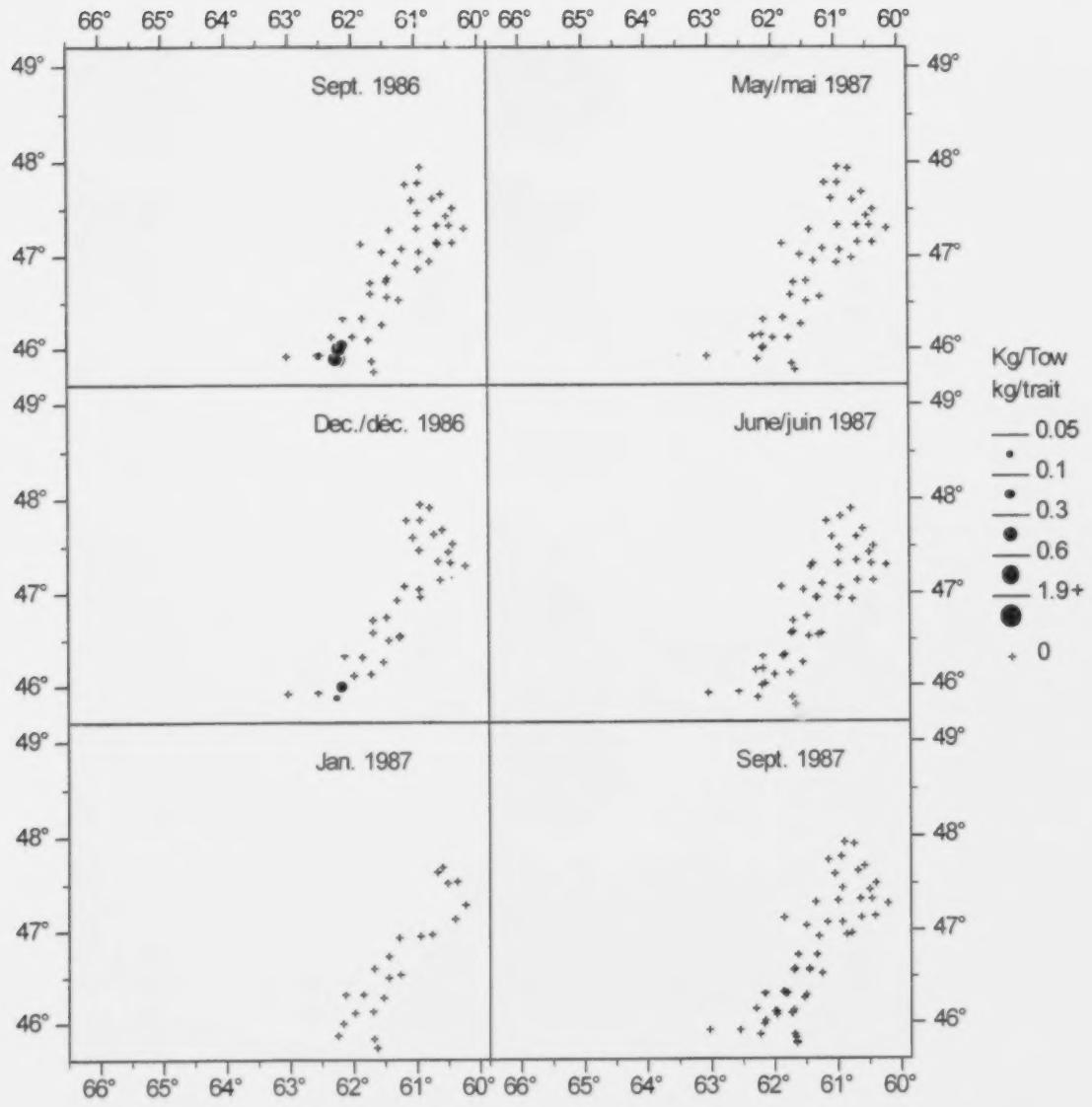

Figure 27a. S.E. Gulf of St. Lawrence seasonal distribution of catches (kg/tow) of Butterfish, *Peprilus triacanthus*

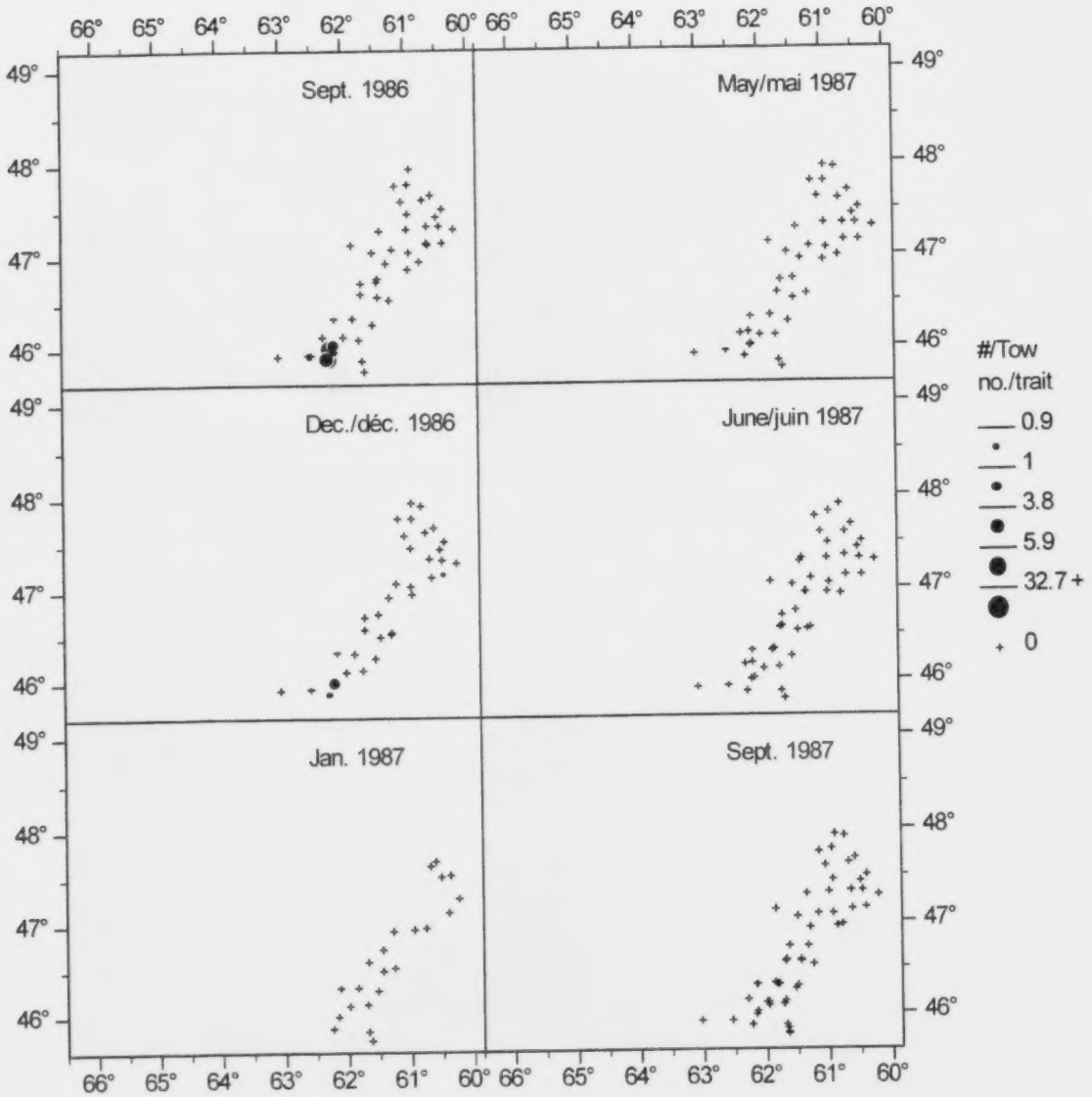

Figure 27b. S.E. Gulf of St. Lawrence seasonal distribution of catches (#/tow) of Butterfish, *Peprilus triacanthus*

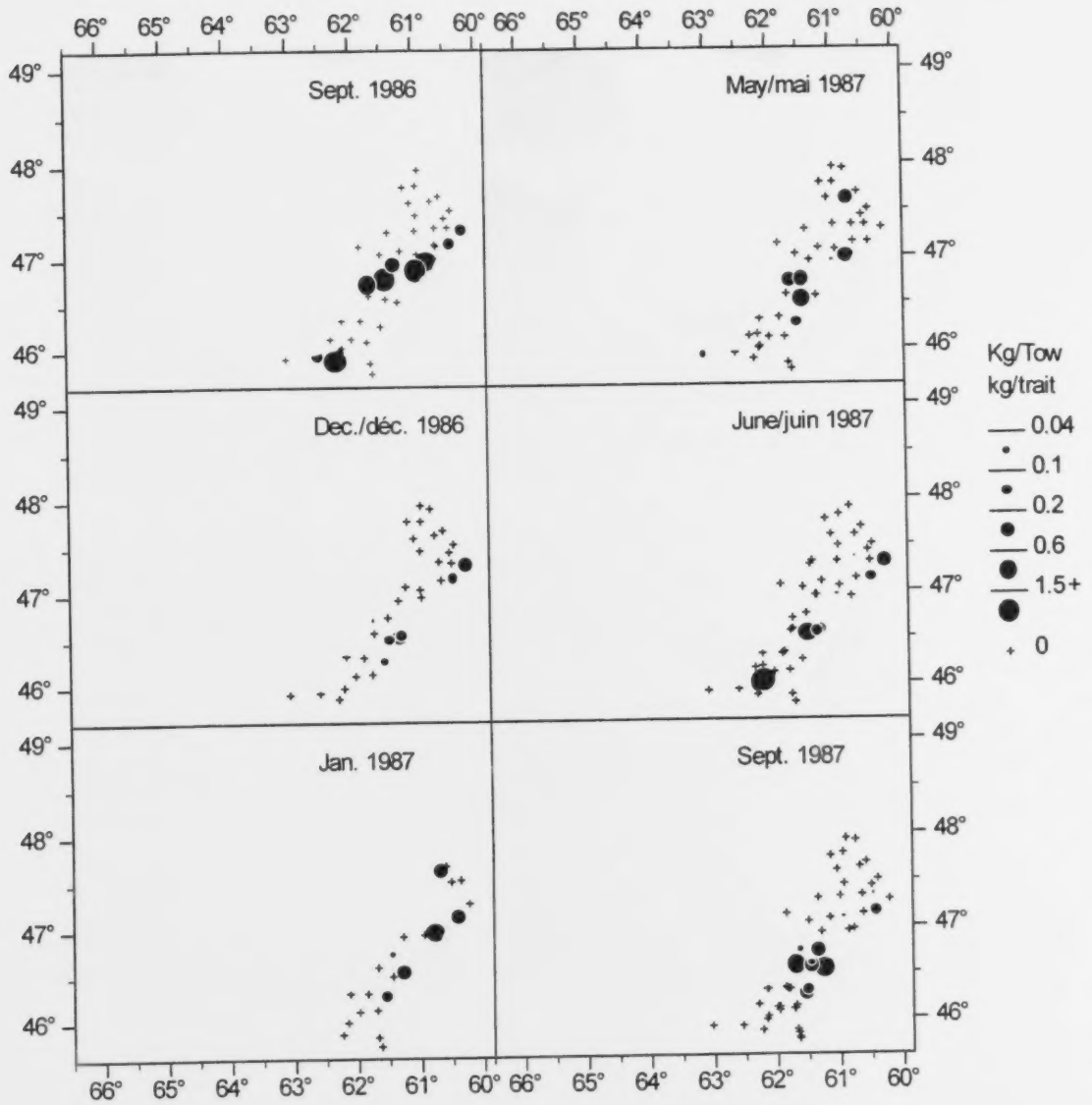

Figure 28a. S.E. Gulf of St. Lawrence seasonal distribution of catches (kg/tow) of Eelpout, *Lycodes sp.*

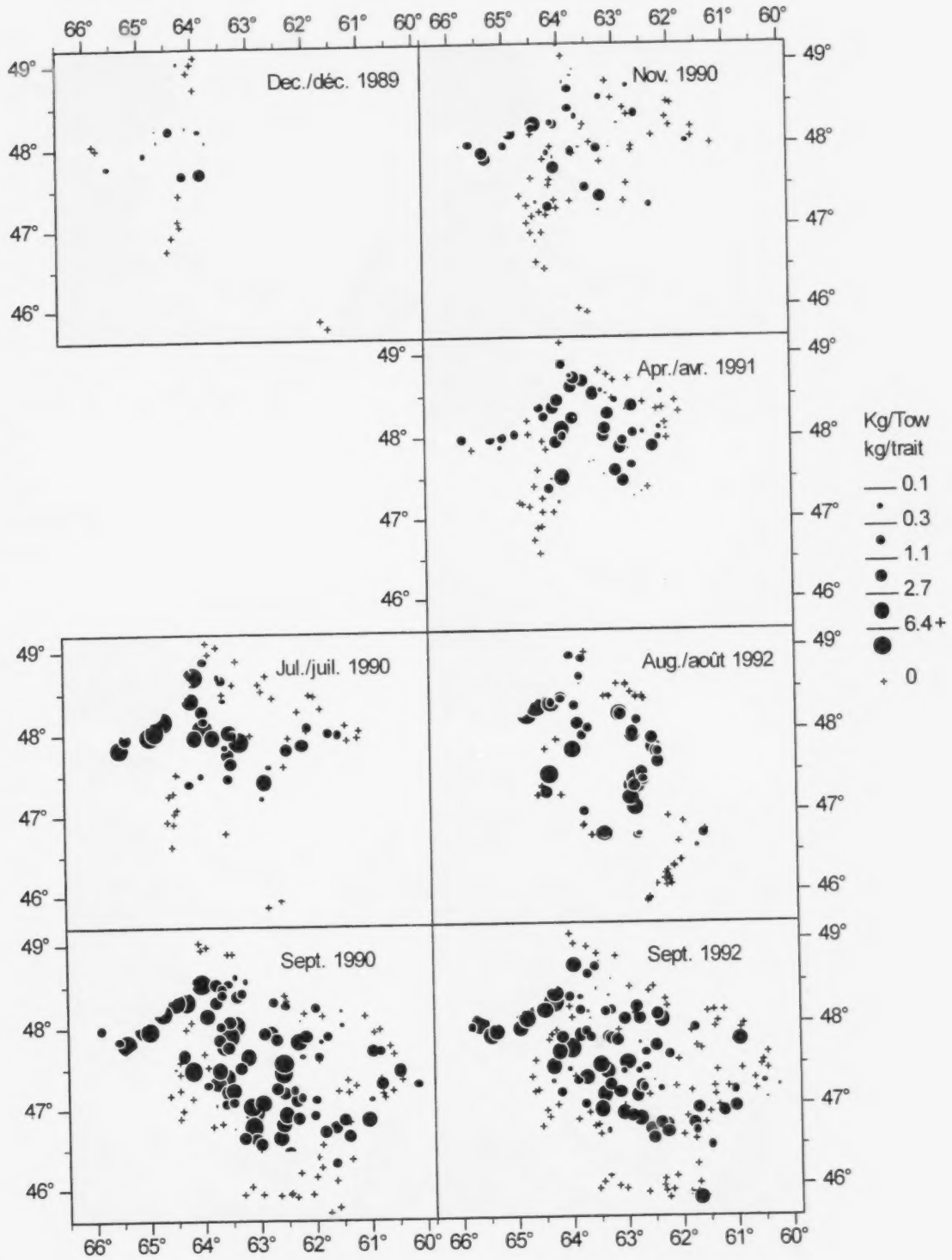

Figure 28b. S.W. Gulf of St. Lawrence seasonal distribution of catches (kg/tow) of Eelpout, *Lycodes sp.*

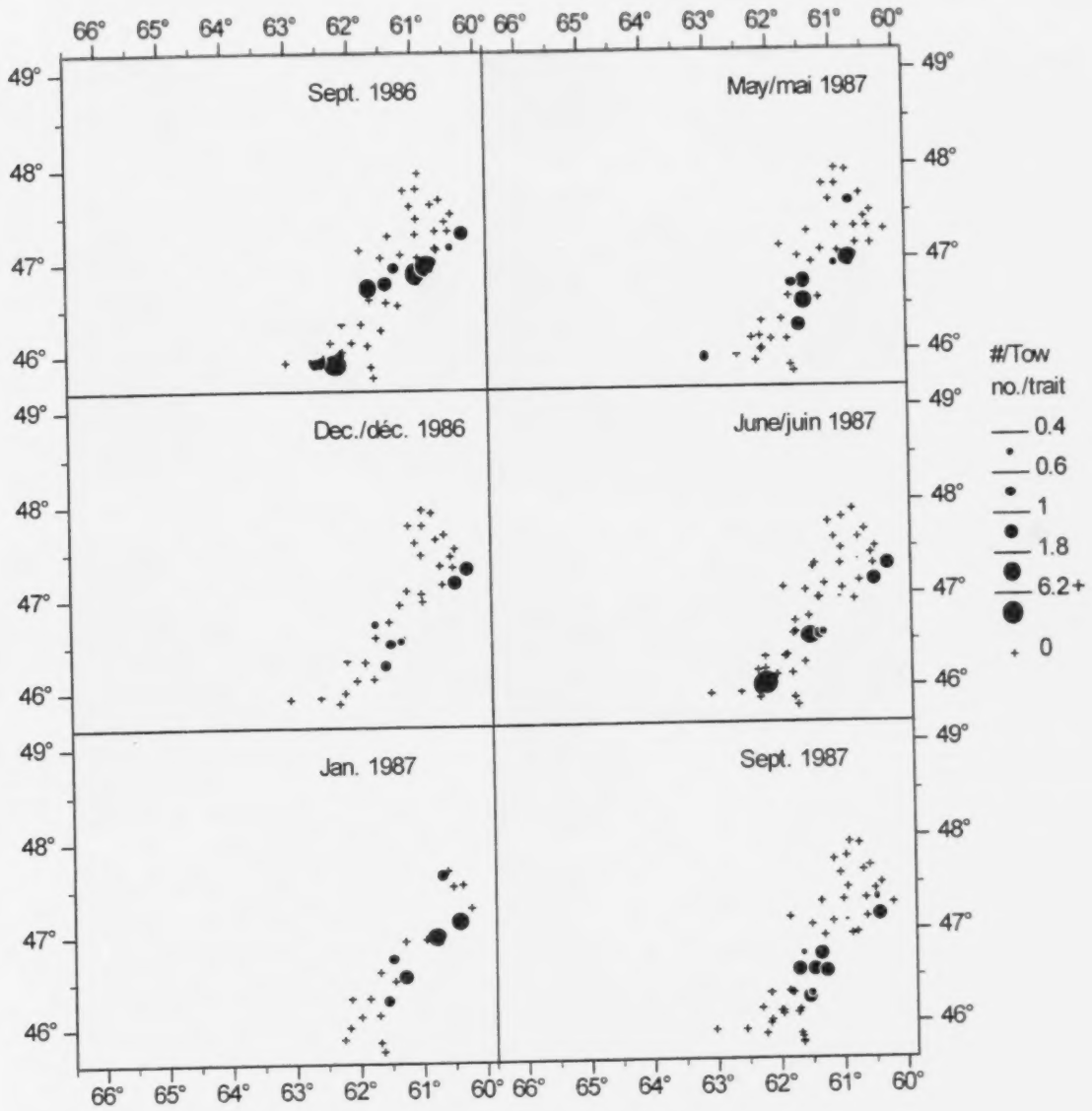

Figure 28c. S.E. Gulf of St. Lawrence seasonal distribution of catches (#/tow) of Eelpout, *Lycodes sp.*

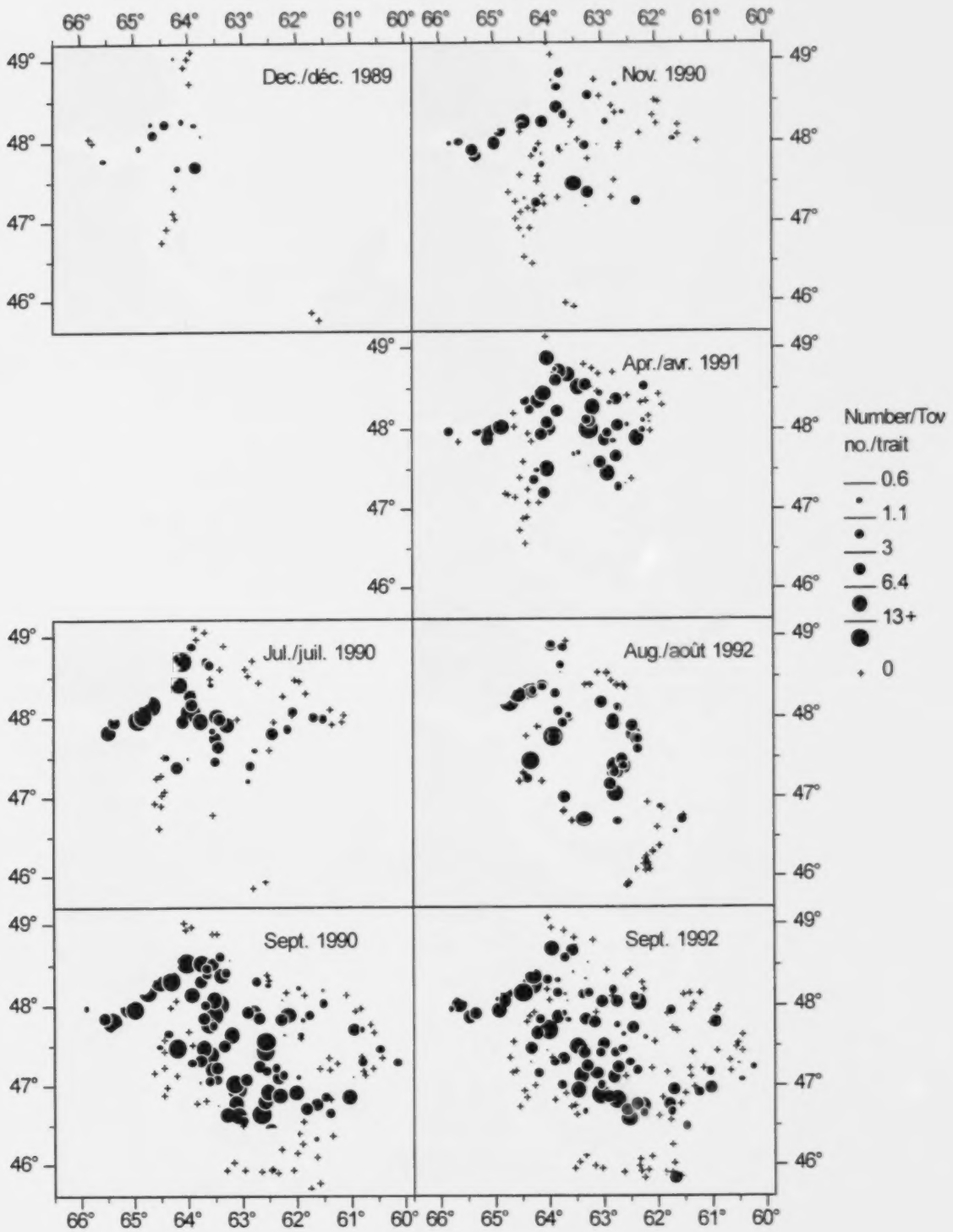

Figure 28d. S.W. Gulf of St. Lawrence seasonal distribution of catches (#/tow) of Eelpout, *Lycodes sp.*

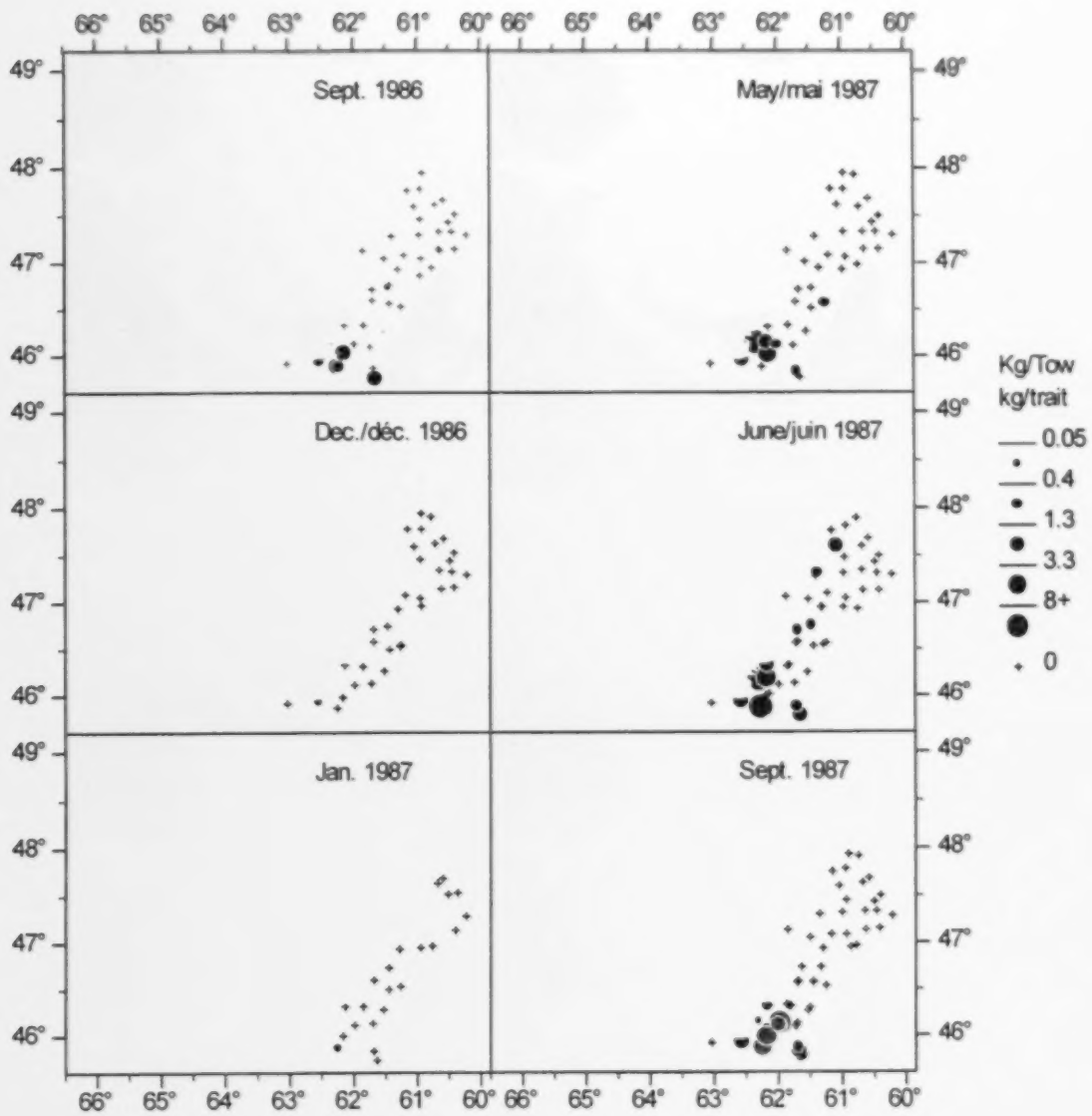

Figure 29a. S.E. Gulf of St. Lawrence seasonal distribution of catches (kg/tow) of Common Ocean Pout, *Zoarces americanus*

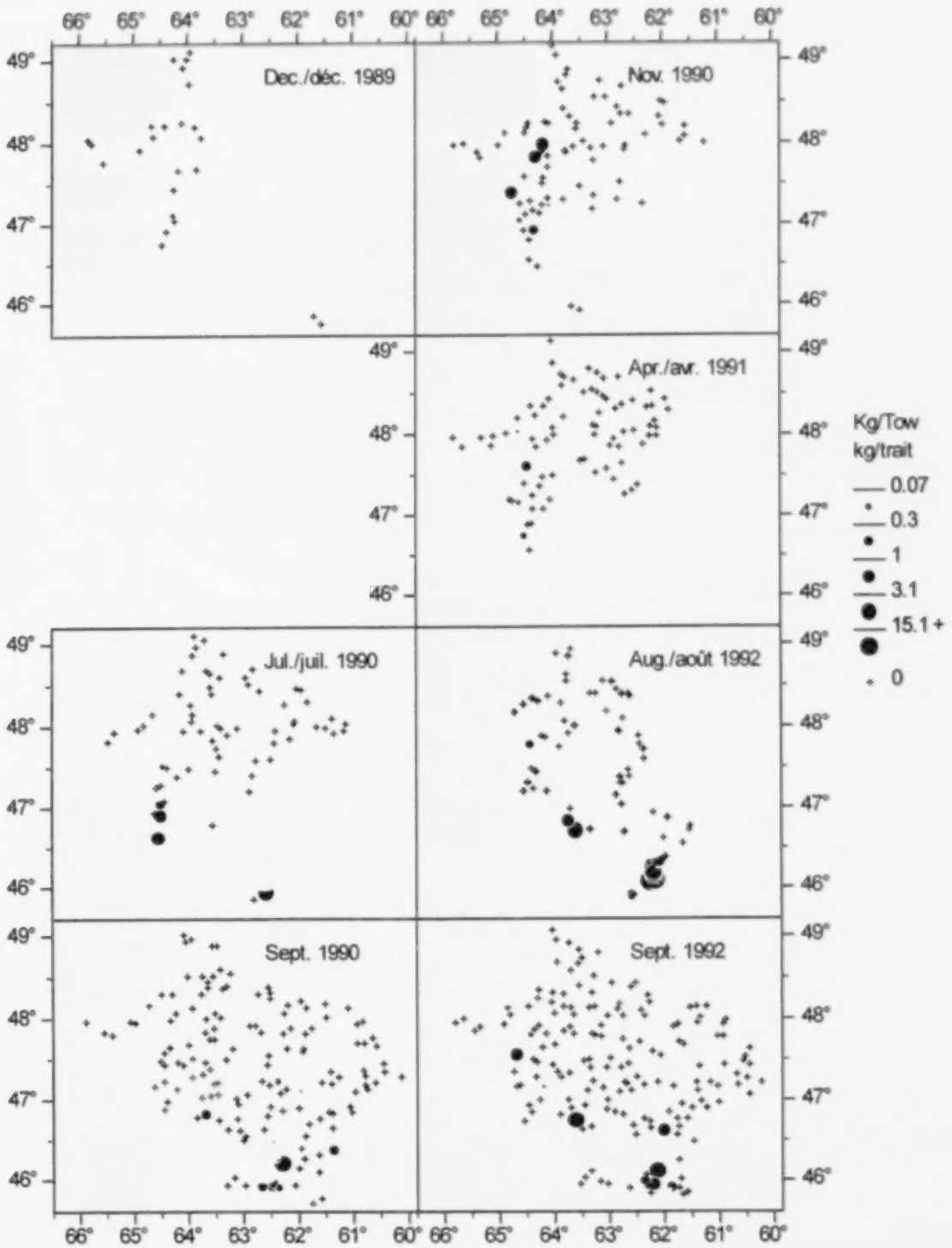

Figure 29b. S.W. Gulf of St. Lawrence seasonal distribution of catches (kg/tow) of Common Ocean Pout, *Zoarces americanus*

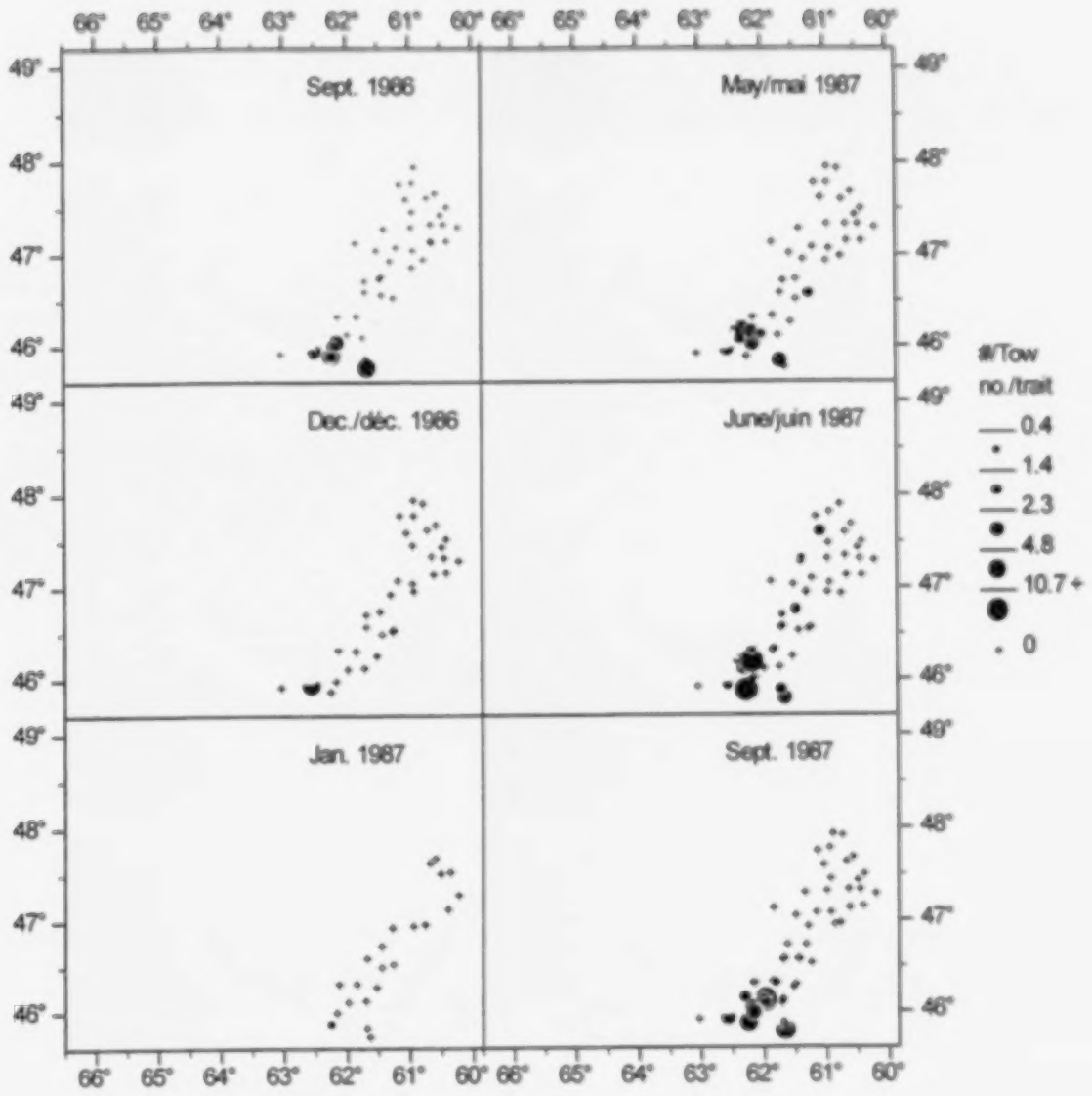

Figure 29c. S.E. Gulf of St. Lawrence seasonal distribution of catches (#/tow) of Common Ocean Pout, *Zoarces americanus*

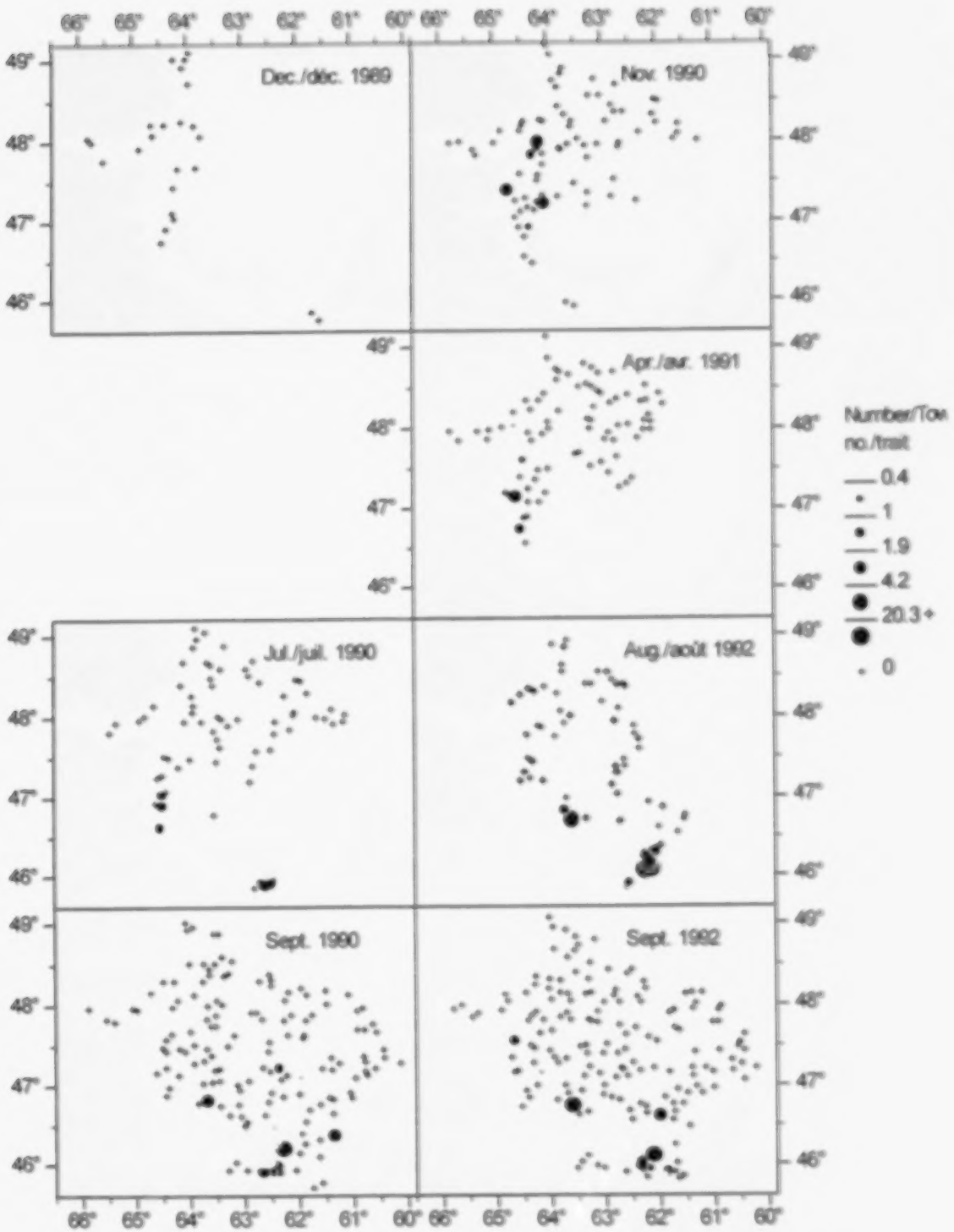

Figure 29d. S.W. Gulf of St. Lawrence seasonal distribution of catches (#/tow) of Common Ocean Pout, *Zoarces americanus*

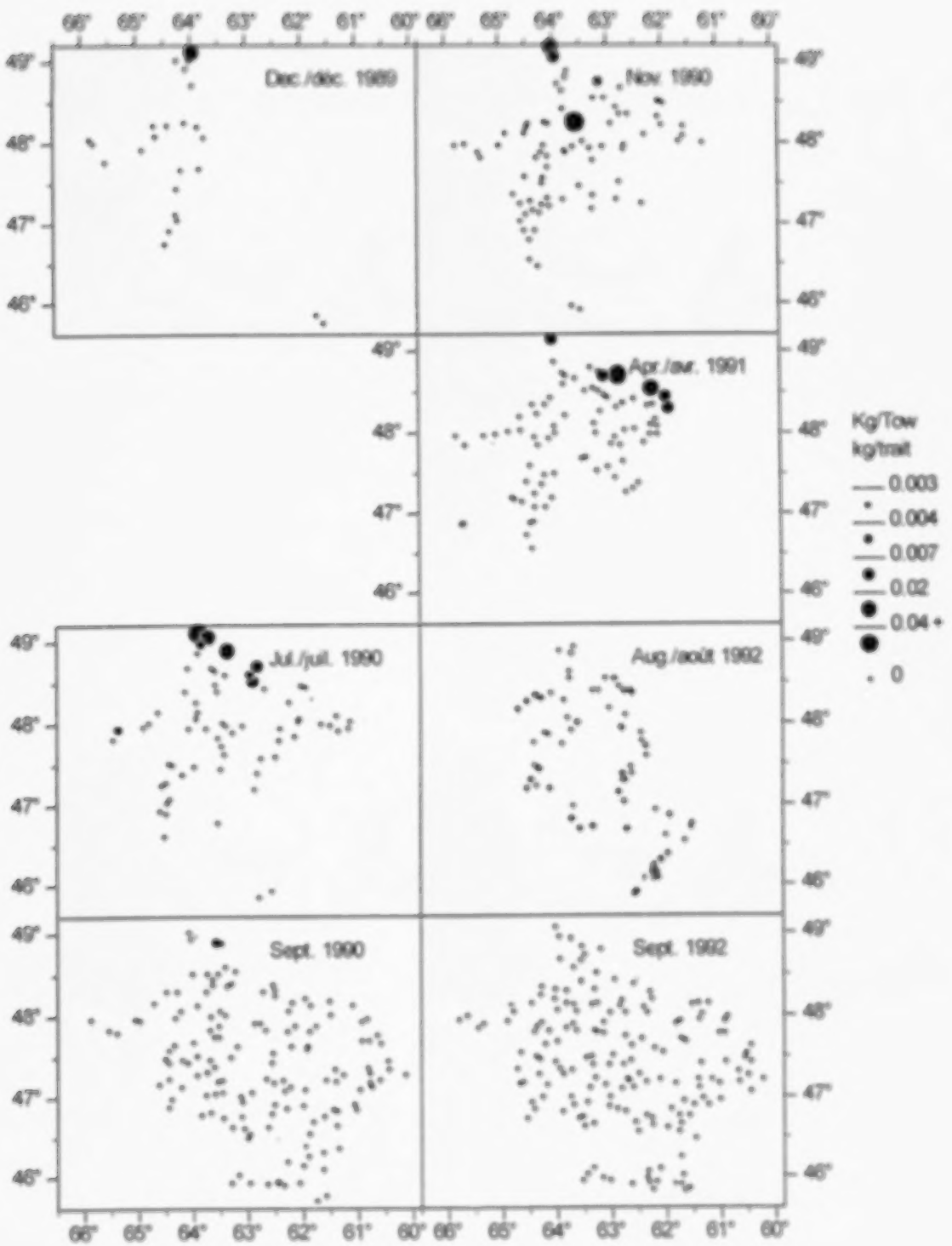

Figure 30a. S.W. Gulf of St. Lawrence seasonal distribution of catches (kg/tow) of Atlantic Soft pout, *Malanostigma atlanticum*

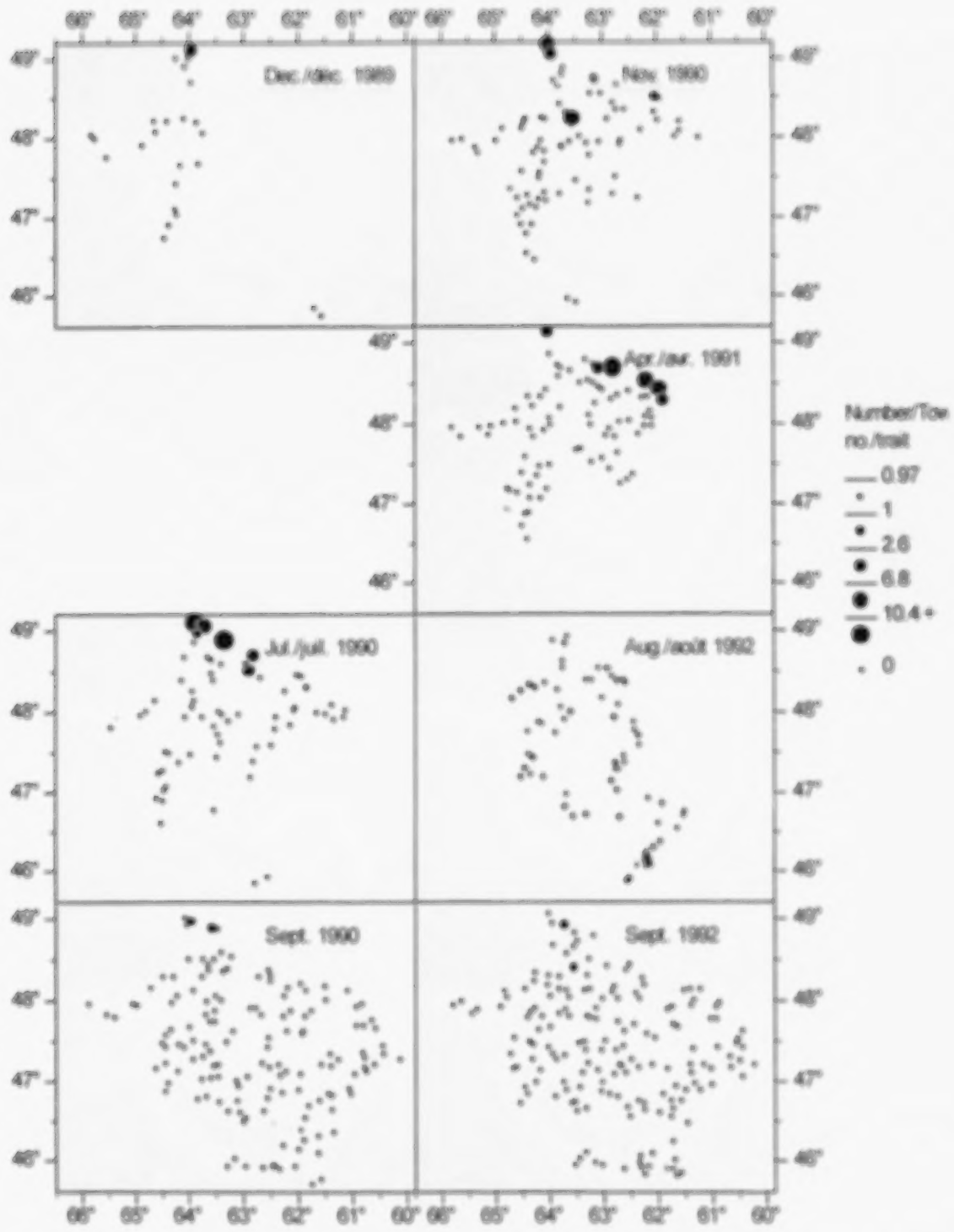

Figure 30b. S.W. Gulf of St. Lawrence seasonal distribution of catches (#/tow) of Atlantic Softpout, *Melanostigma atlanticum*

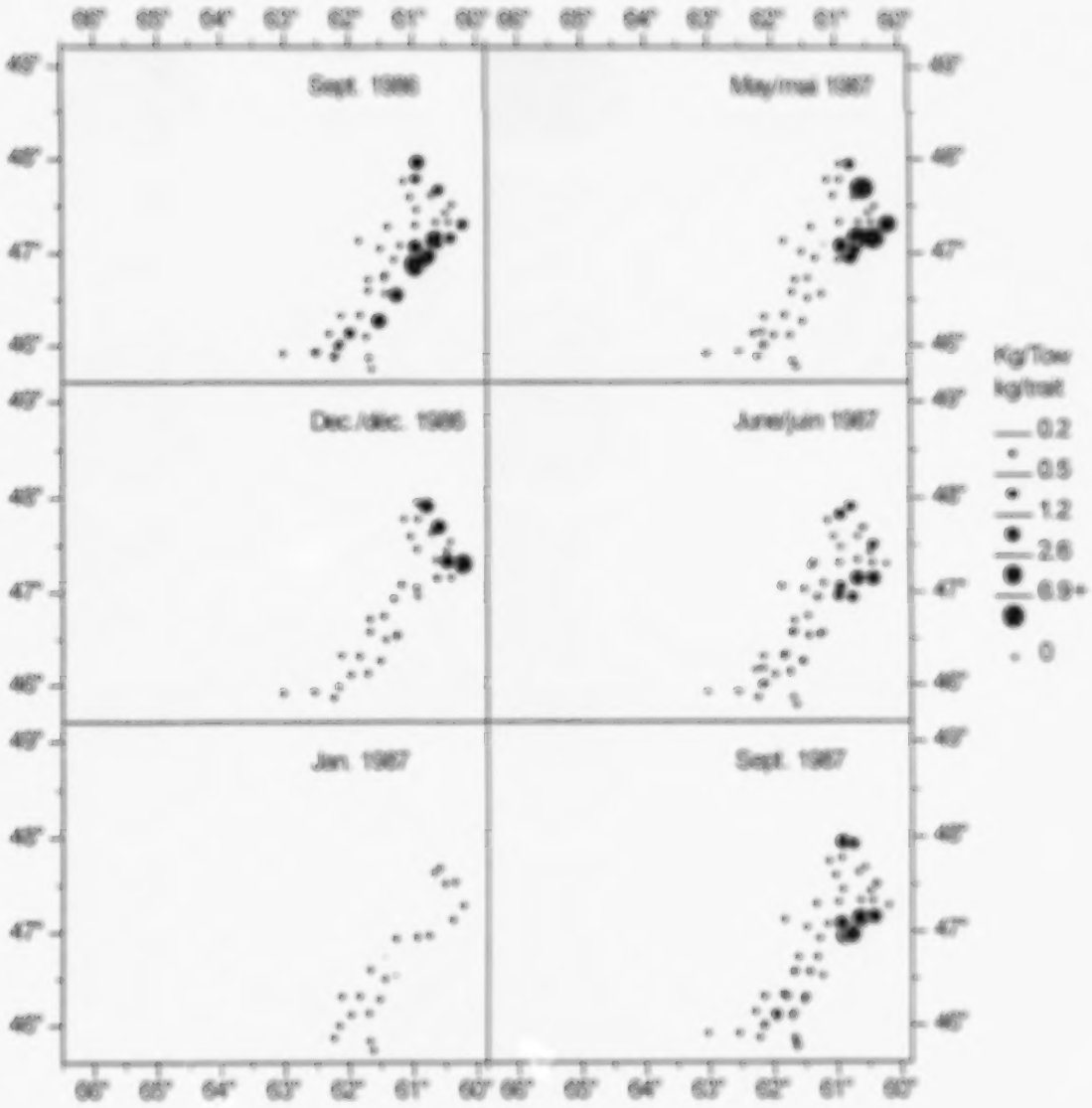

Figure 31a. S.E. Gulf of St. Lawrence seasonal distribution of catches (kg/tow) of Witch Flounder, *Glyptocephalus cynoglossus*

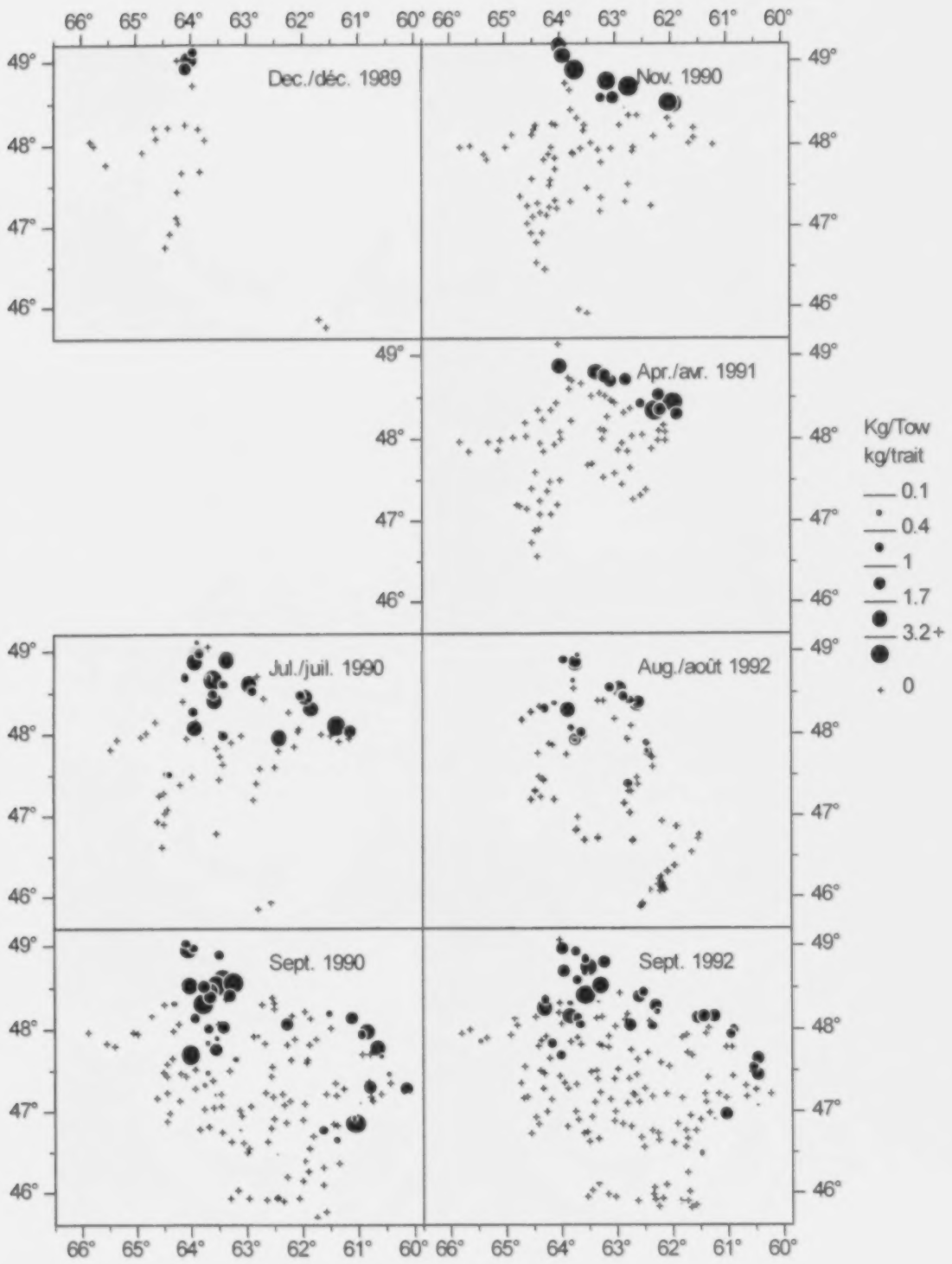

Figure 31b. S.W. Gulf of St. Lawrence seasonal distribution of catches (kg/tow) of Witch Flounder, *Glyptocephalus cynoglossus*

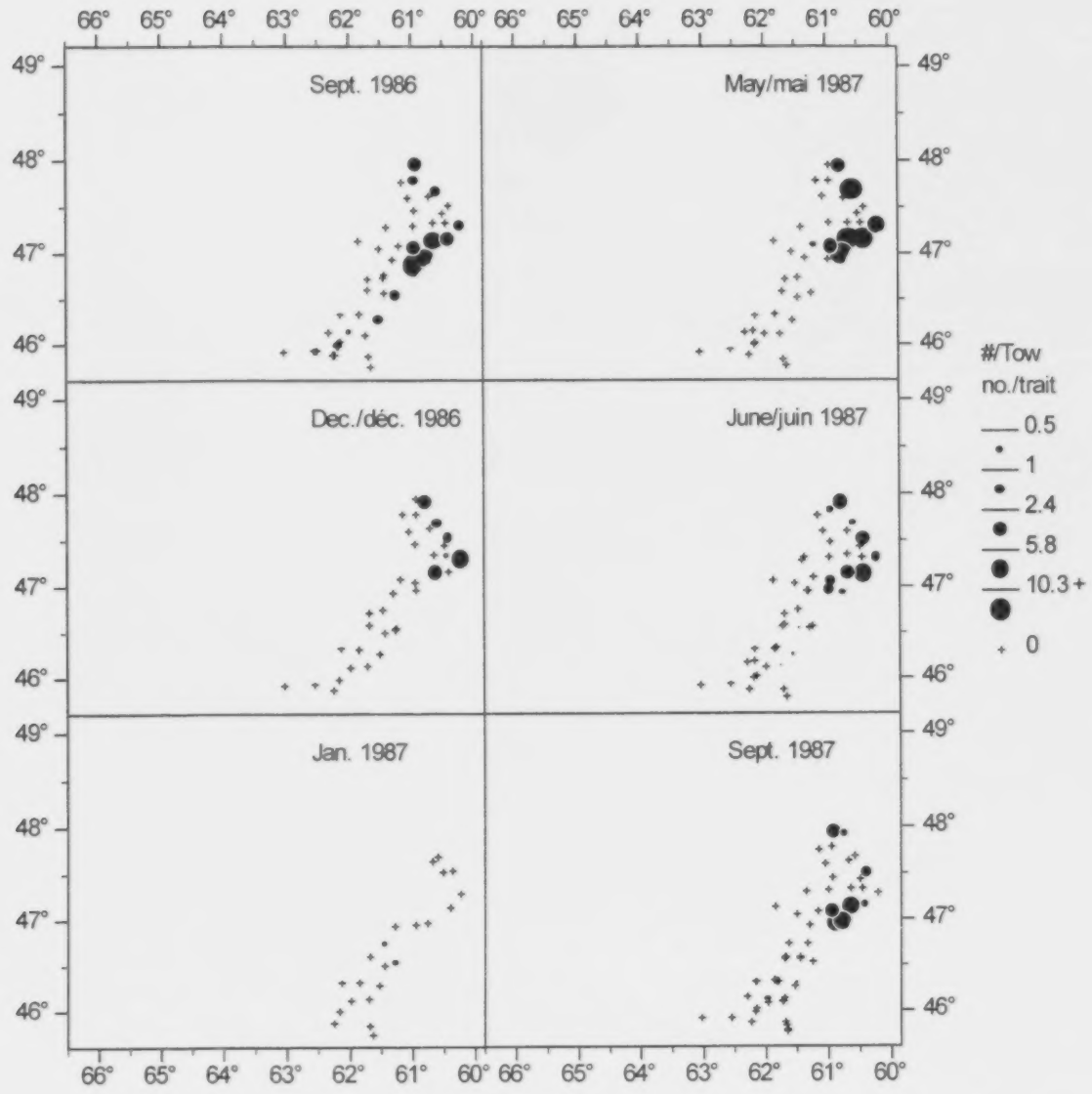

Figure 31c. S.E. Gulf of St. Lawrence seasonal distribution of catches (#/tow) of Witch Flounder, *Glyptocephalus cynoglossus*

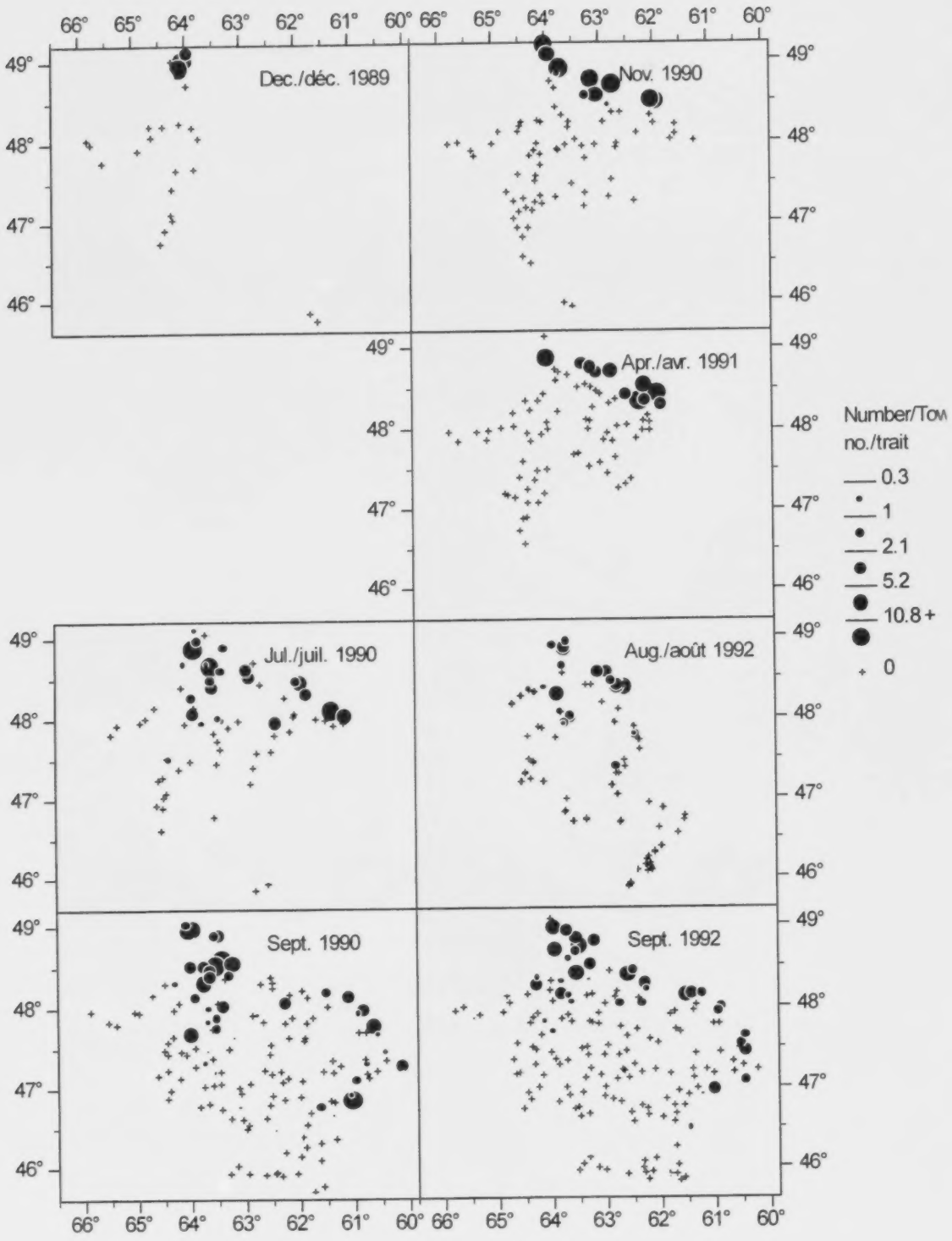

Figure 31d. S.W. Gulf of St. Lawrence seasonal distribution of catches (#/tow) of Witch Flounder, *Glyptocephalus cynoglossus*

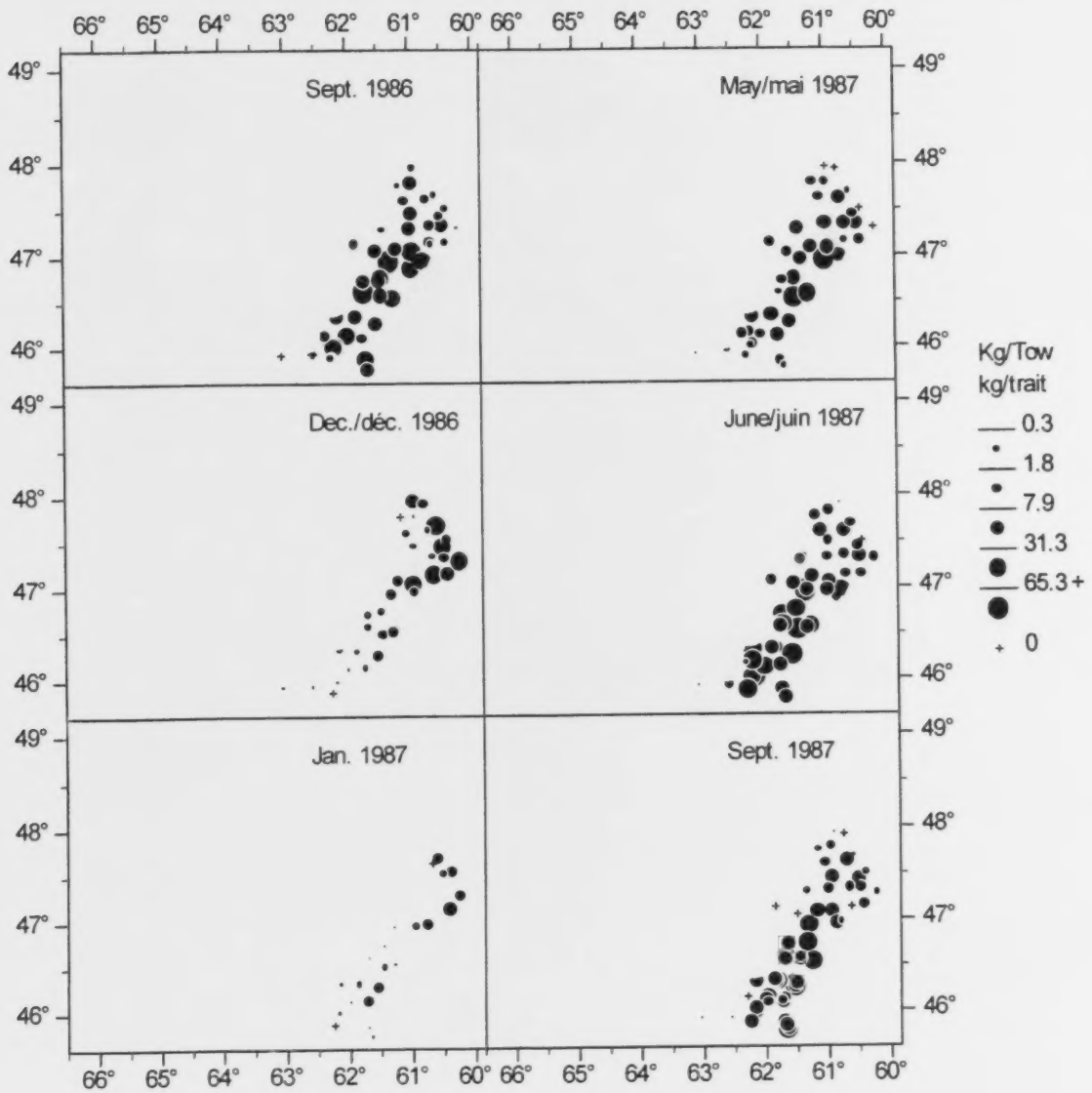

Figure 32a. S.E. Gulf of St. Lawrence seasonal distribution of catches (kg/tow) of American Plaice, *Hippoglossoides platessoides*

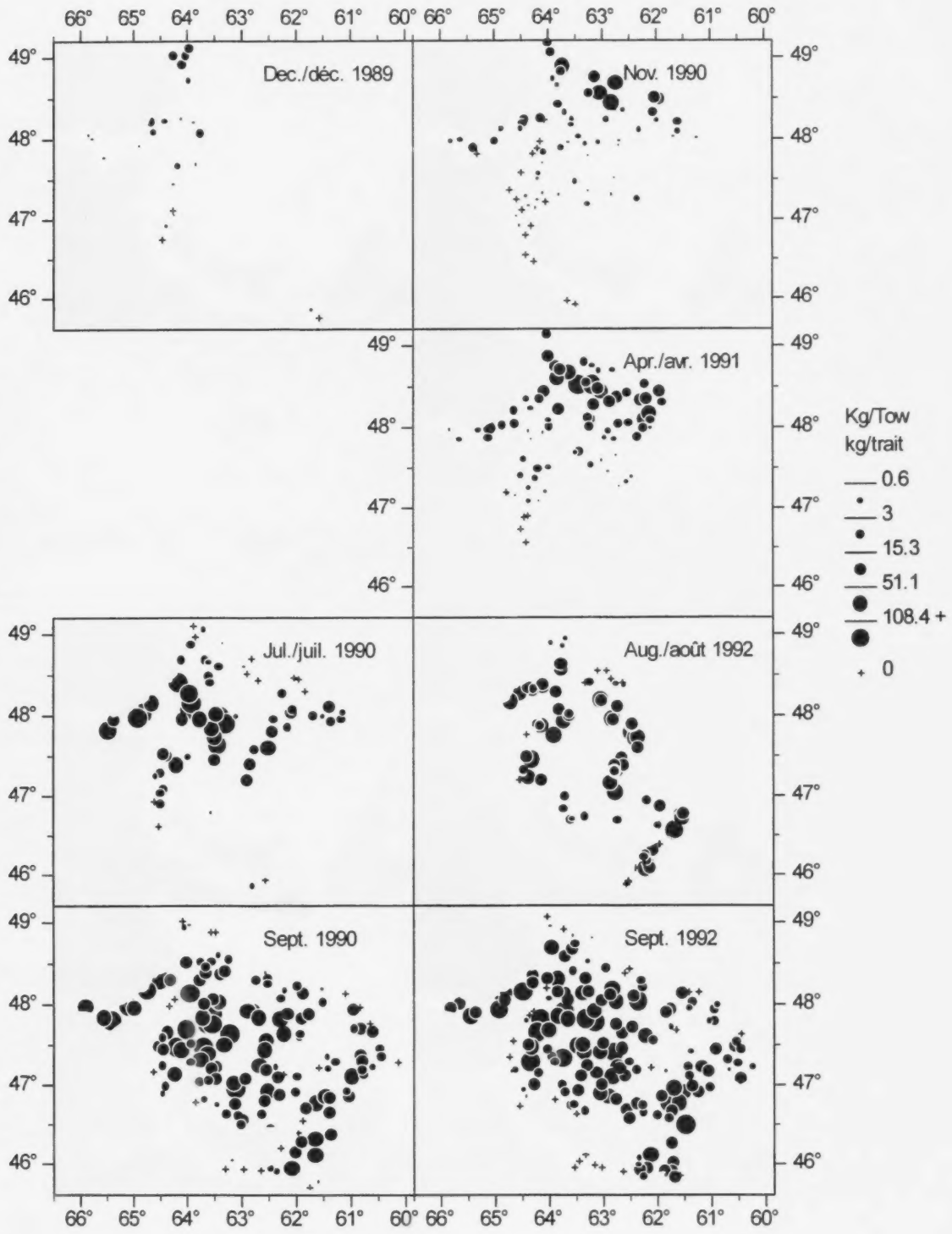

Figure 32b. S.W. Gulf of St. Lawrence seasonal distribution of catches (kg/tow) of American Plaice, *Hippoglossoides platessoides*

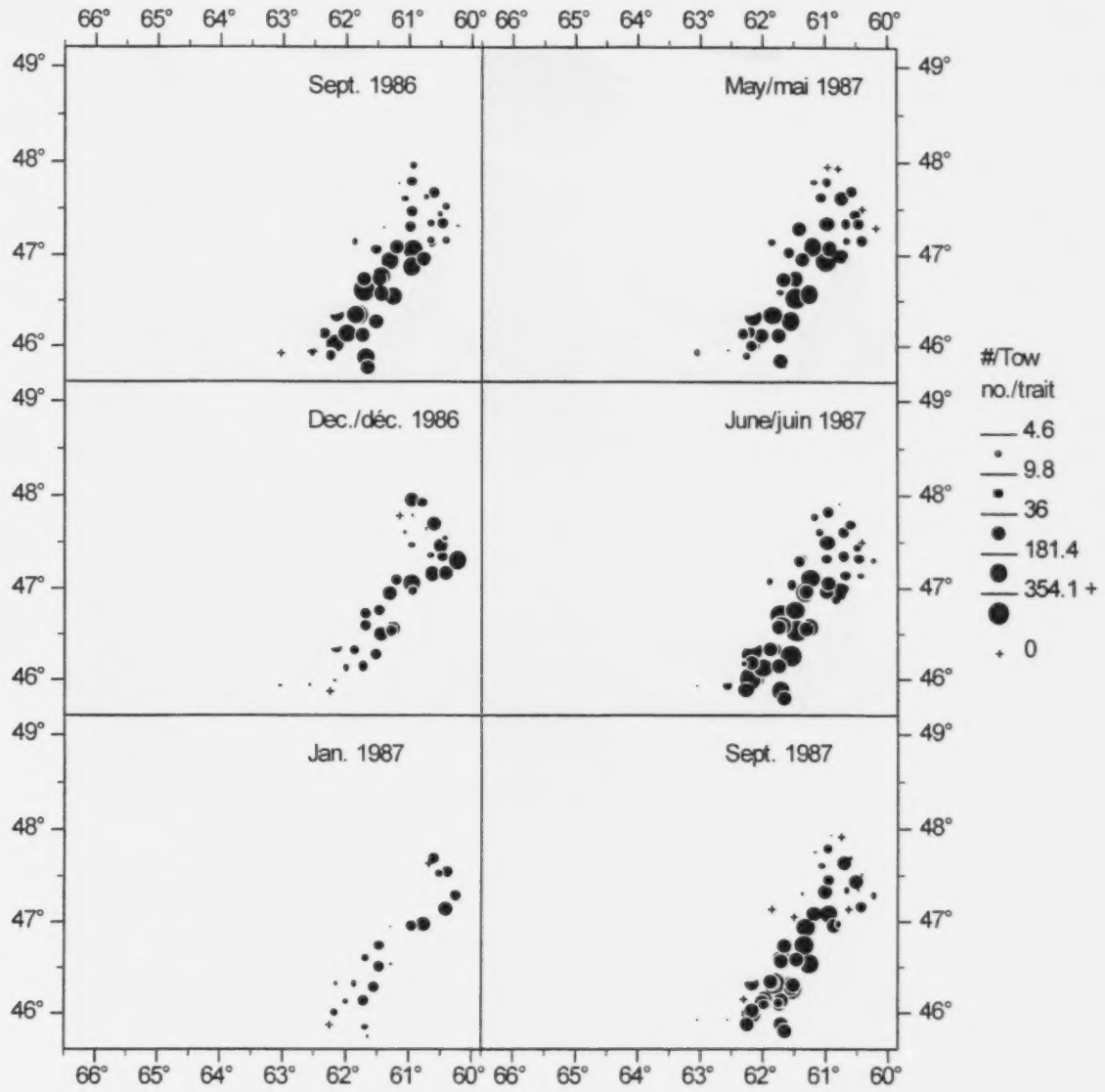

Figure 32c. S.E. Gulf of St. Lawrence seasonal distribution of catches (#/tow) of American Plaice, *Hippoglossoides platessoides*

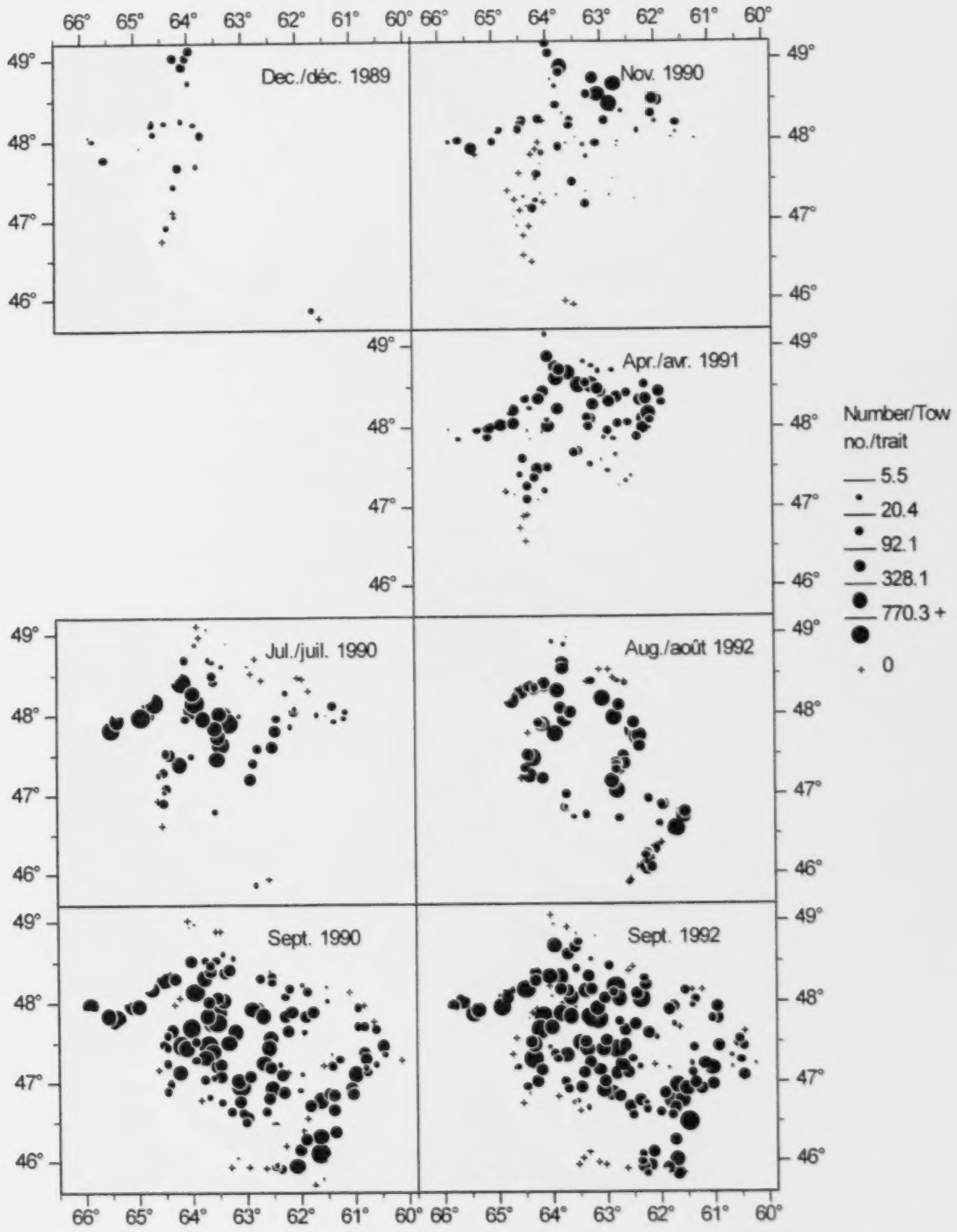

Figure 32d. S.W. Gulf of St. Lawrence seasonal distribution of catches (#/tow) of American Plaice, *Hippoglossoides platessoides*

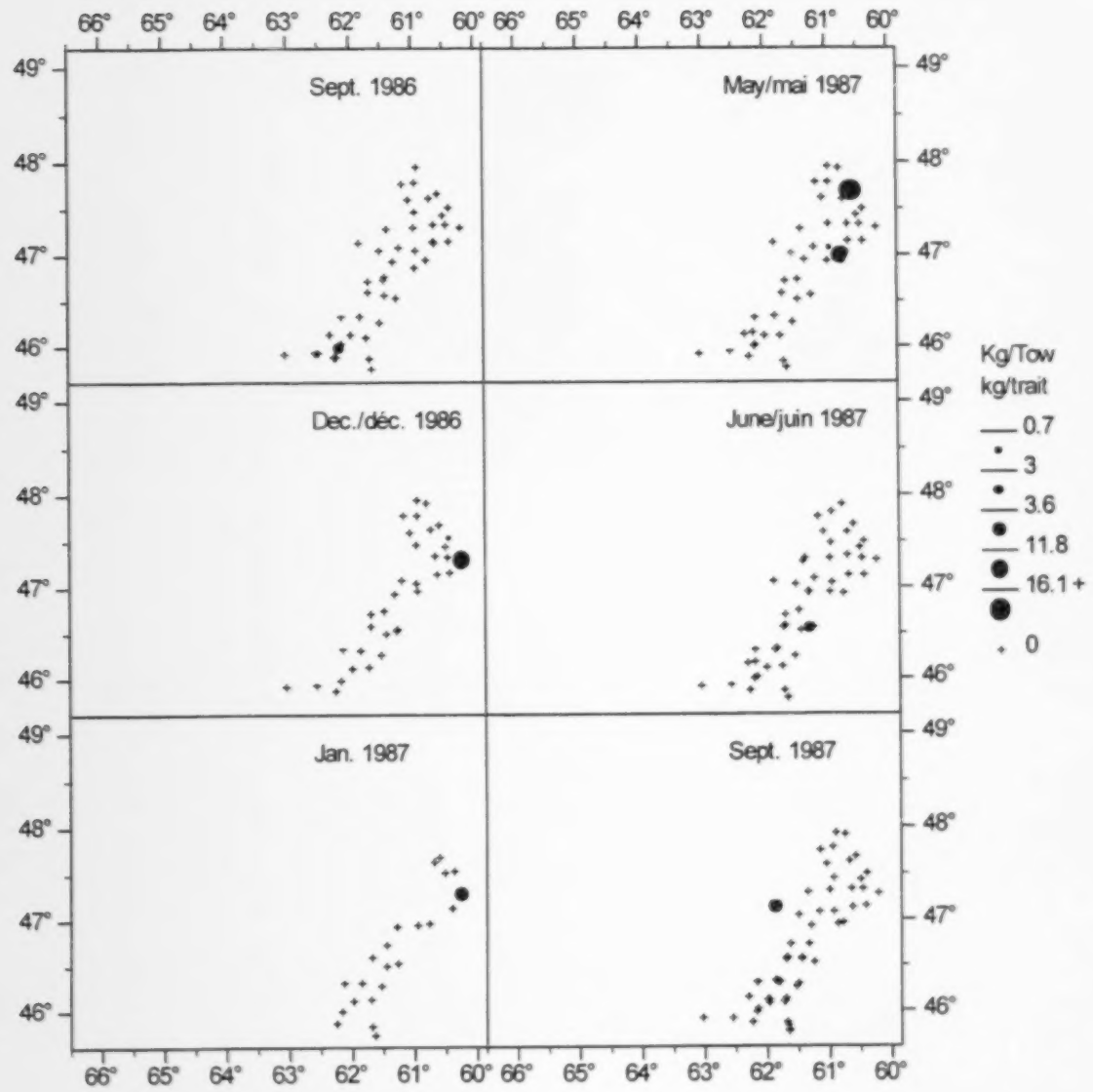

Figure 33a. S.E. Gulf of St. Lawrence seasonal distribution of catches (kg/tow) of Atlantic Halibut, *Hippoglossus hippoglossus*

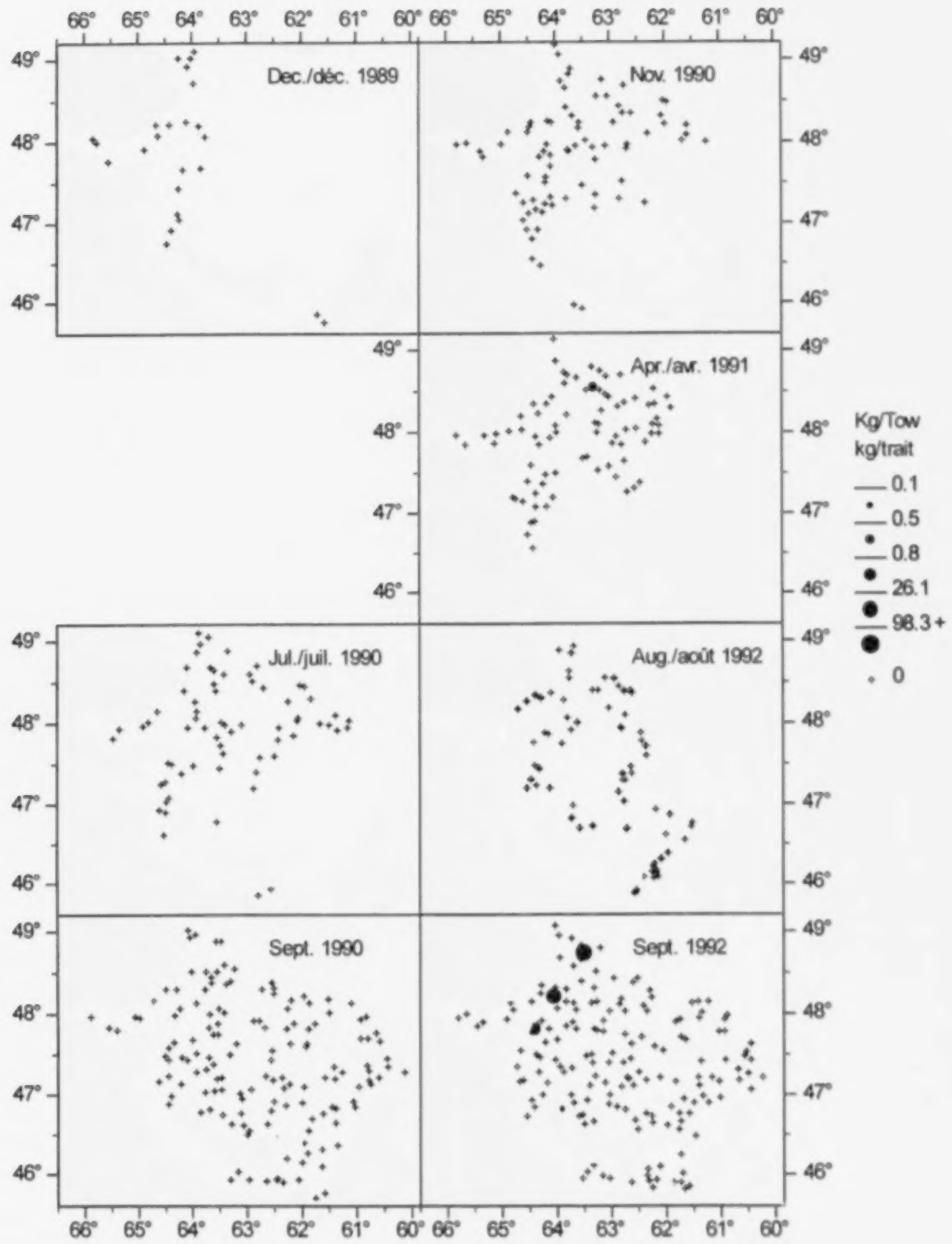

Figure 33b. S.W. Gulf of St. Lawrence seasonal distribution of catches (kg/tow) of Atlantic Halibut, *Hippoglossus hippoglossus*

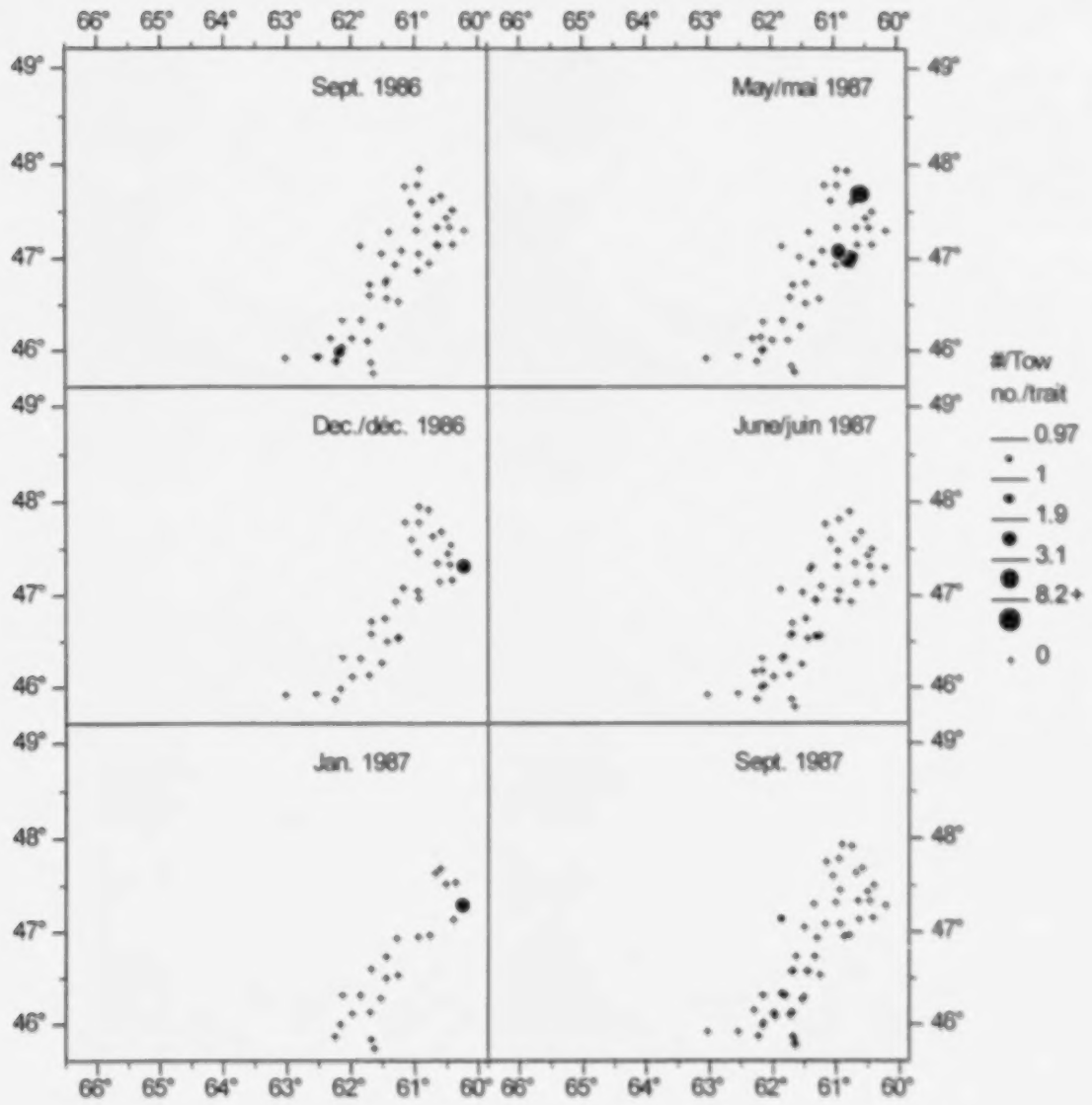

Figure 33c. S.E. Gulf of St. Lawrence seasonal distribution of catches (#/tow) of Atlantic Halibut, *Hippoglossus hippoglossus*

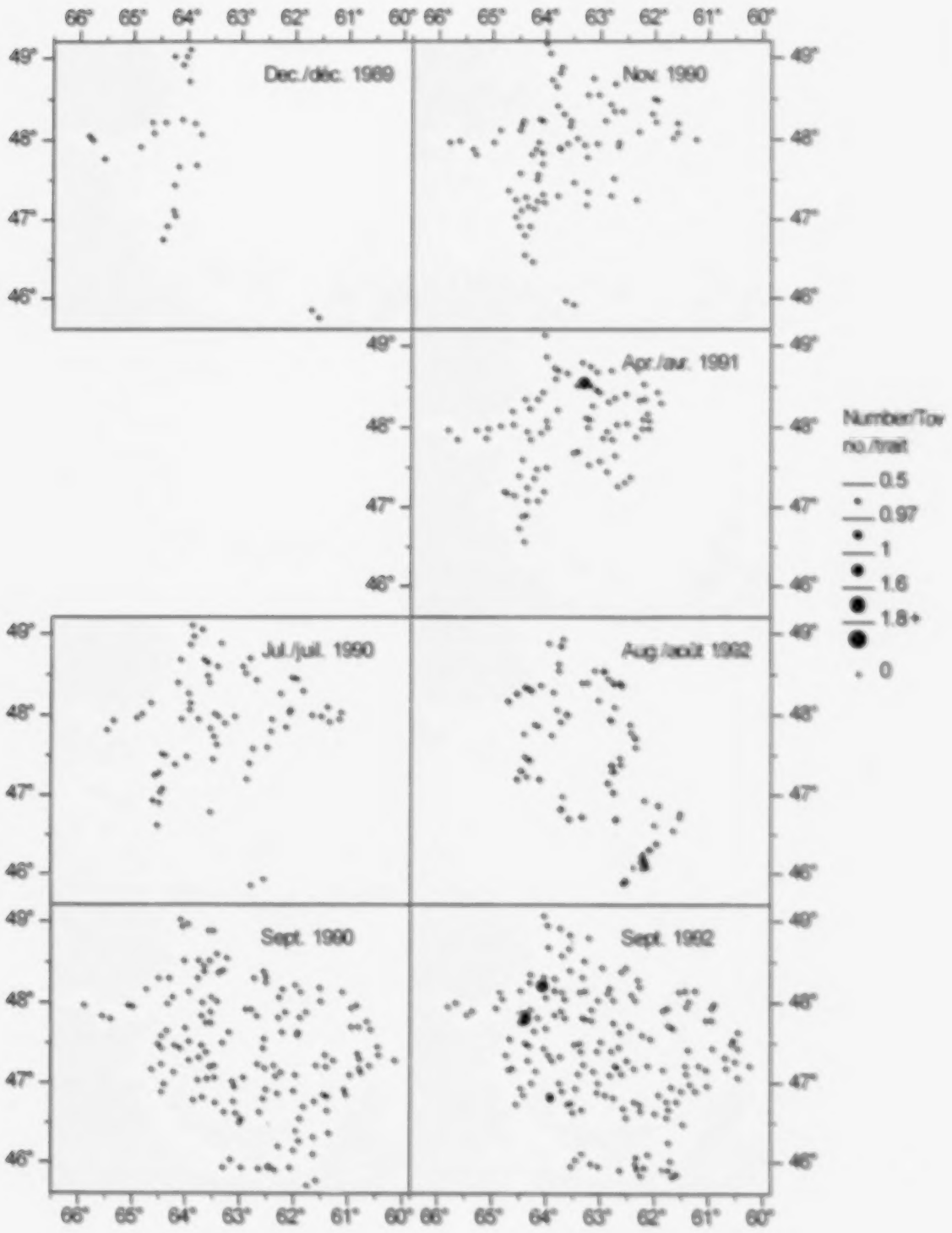

Figure 33d: S.W. Gulf of St. Lawrence seasonal distribution of catches (#/tow) of Atlantic Halibut, *Hippoglossus hippoglossus*

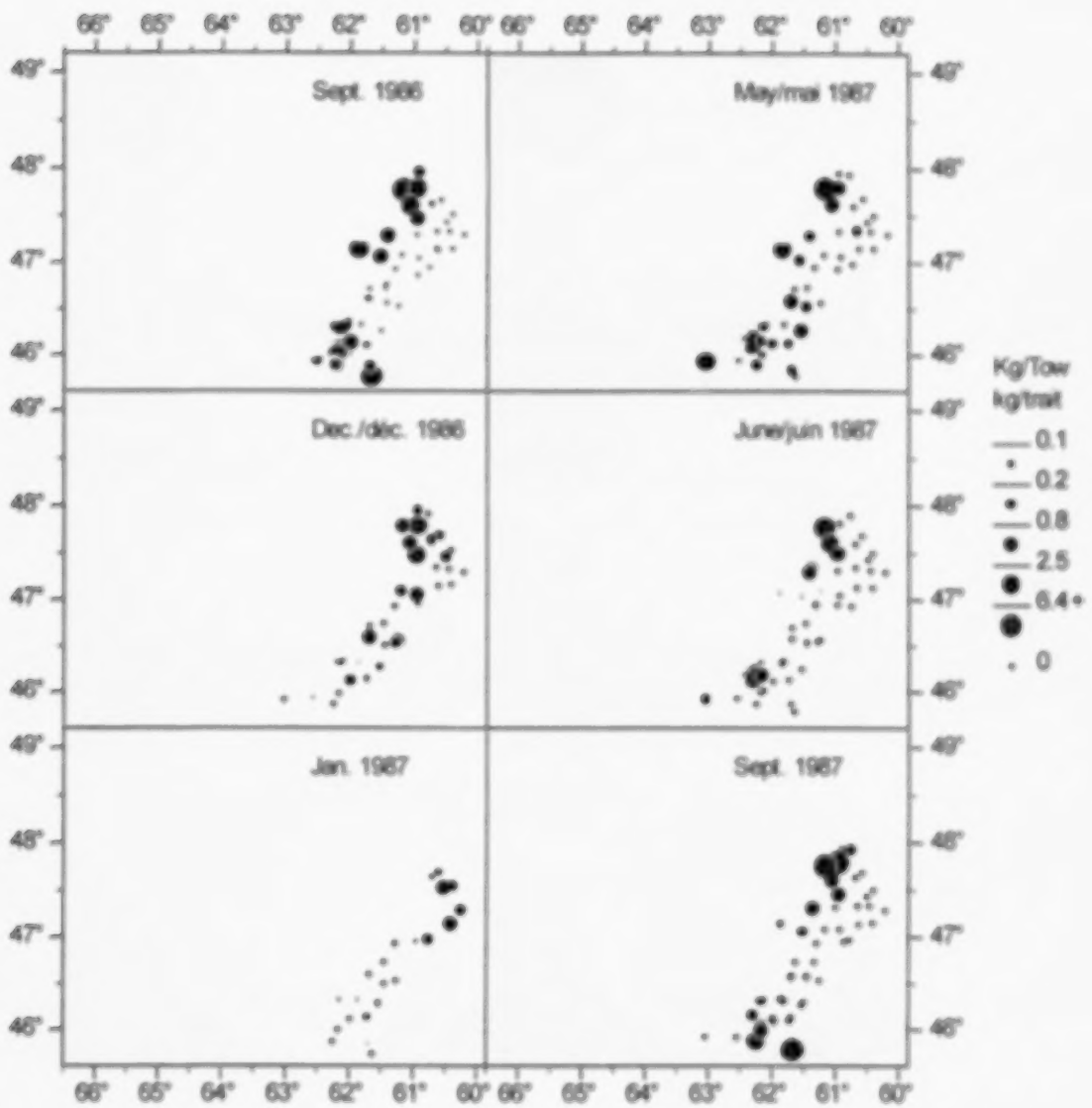

Figure 34a. S.E. Gulf of St. Lawrence seasonal distribution of catches (kg/tow) of Yellowtail Flounder, *Limanda ferruginea*

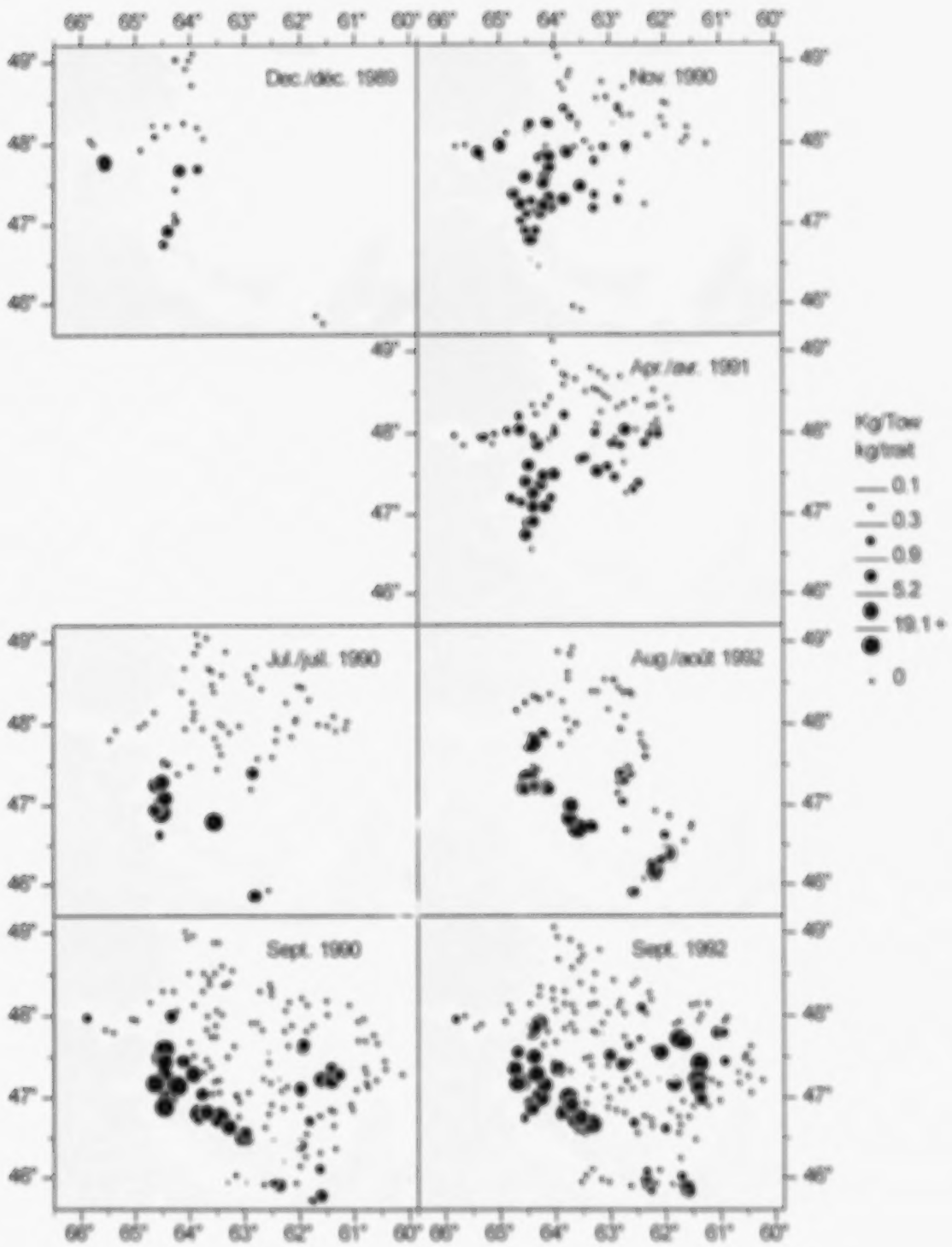

Figure 34b. S.W. Gulf of St. Lawrence seasonal distribution of catches (kg/tow) of Yellowtail Flounder, *Limanda ferruginea*

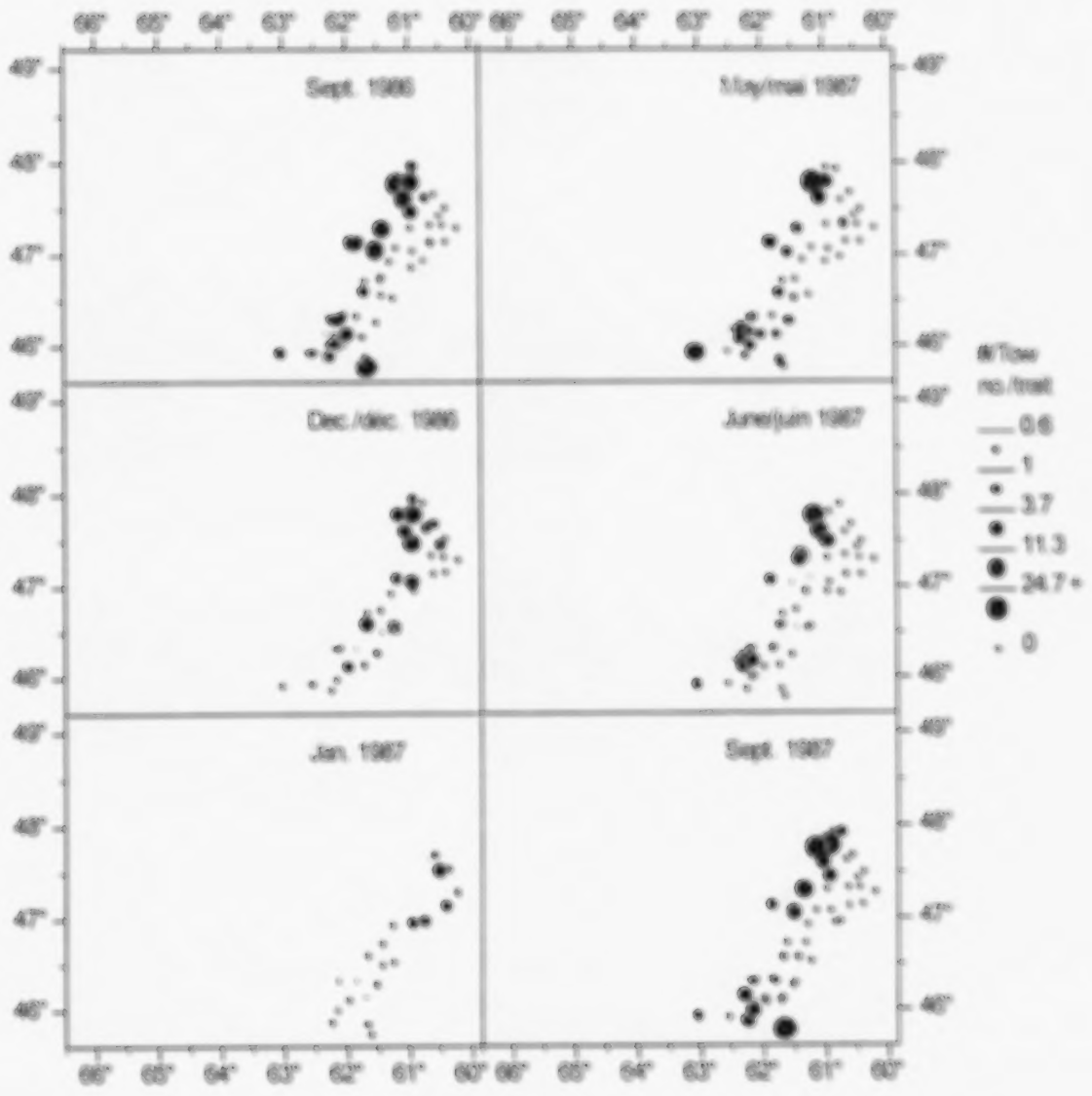

Figure 34c. S.E. Gulf of St. Lawrence seasonal distribution of catches (#/tow) of Yellowtail Flounder, *Limanda ferruginea*

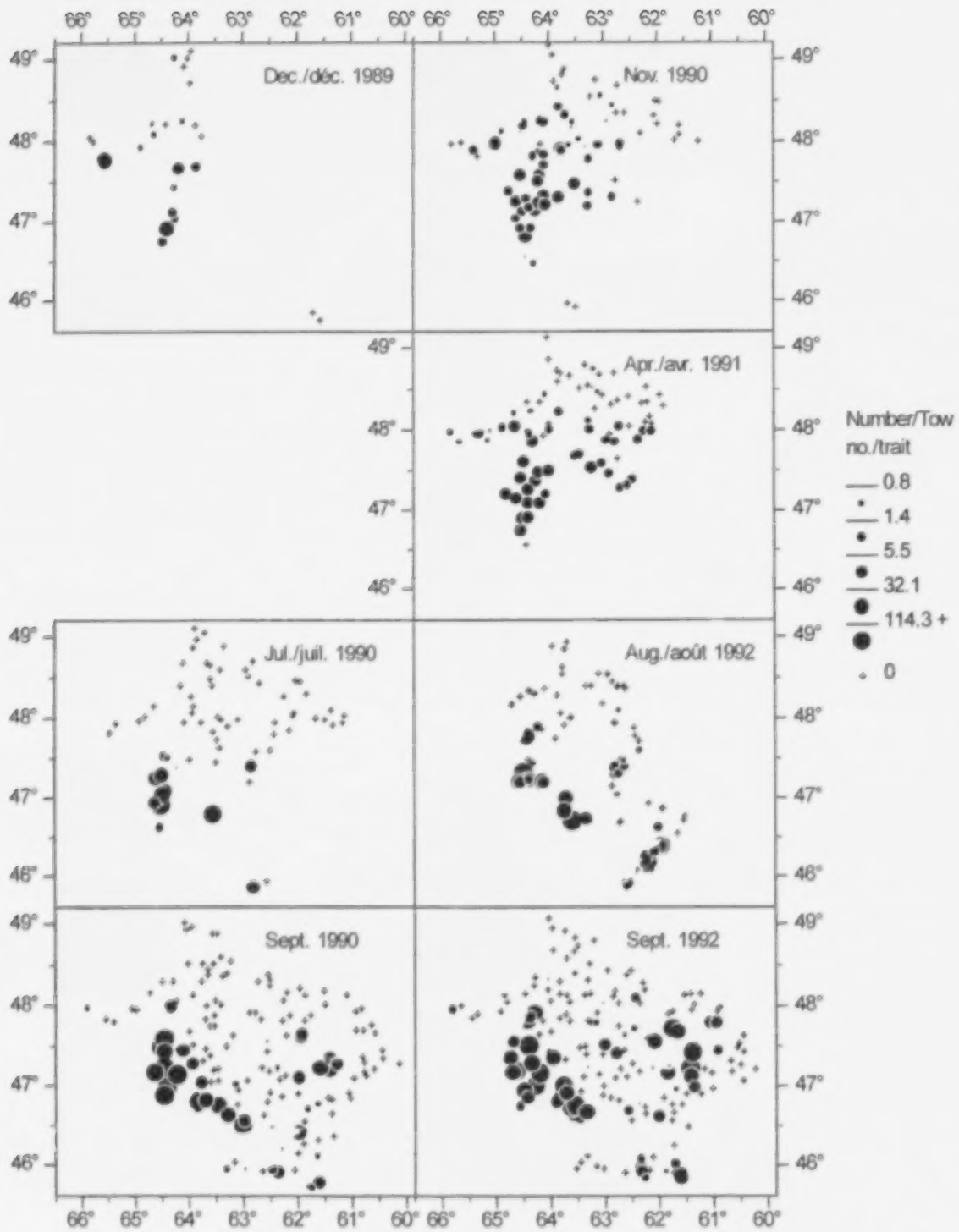

Figure 34d. S.W. Gulf of St. Lawrence seasonal distribution of catches (#/tow) of Yellowtail Flounder, *Limanda ferruginea*

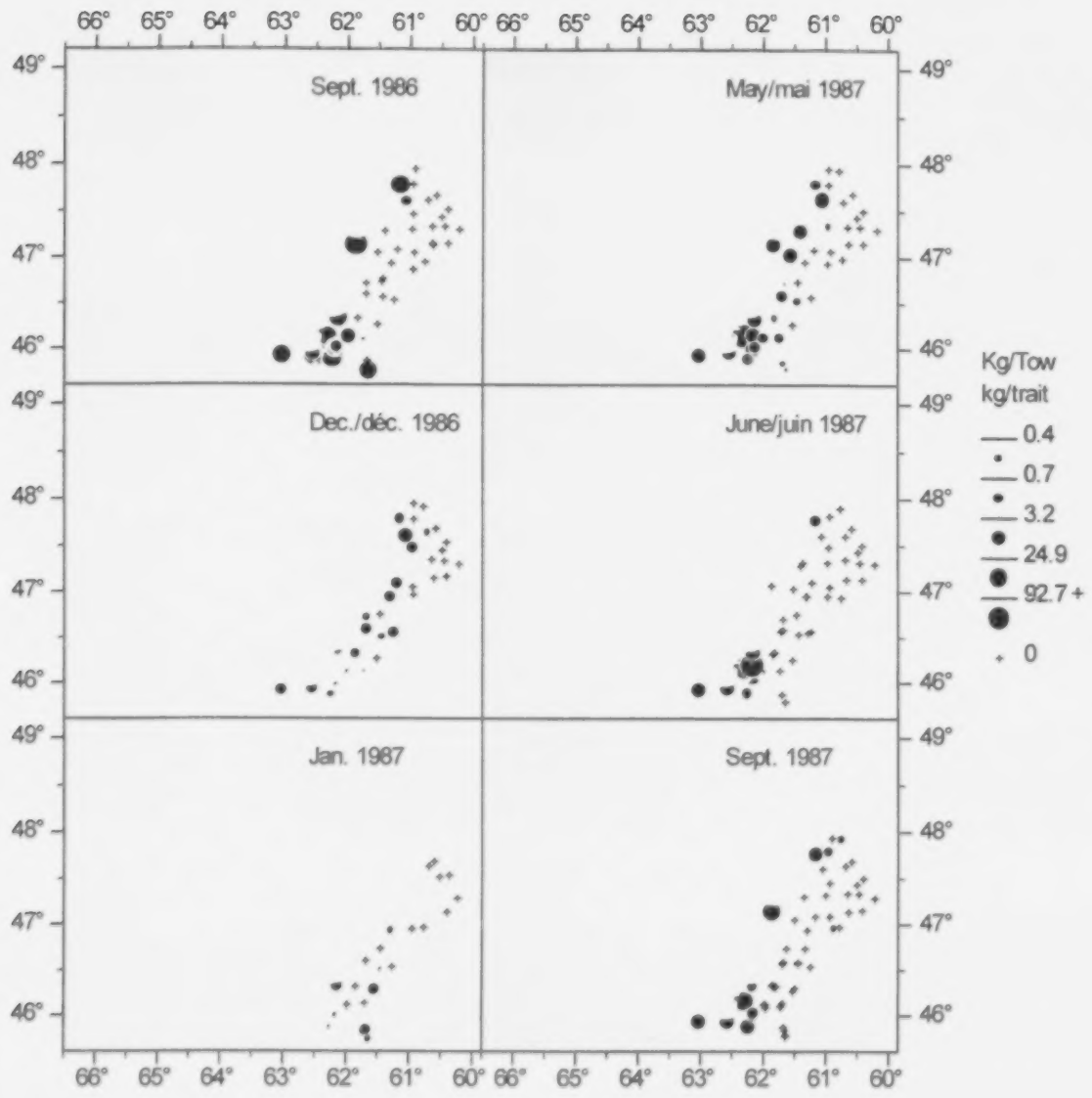

Figure 35a. S.E. Gulf of St. Lawrence seasonal distribution of catches (kg/tow) of Winter Flounder, *Pseudopleuronectes americanus*

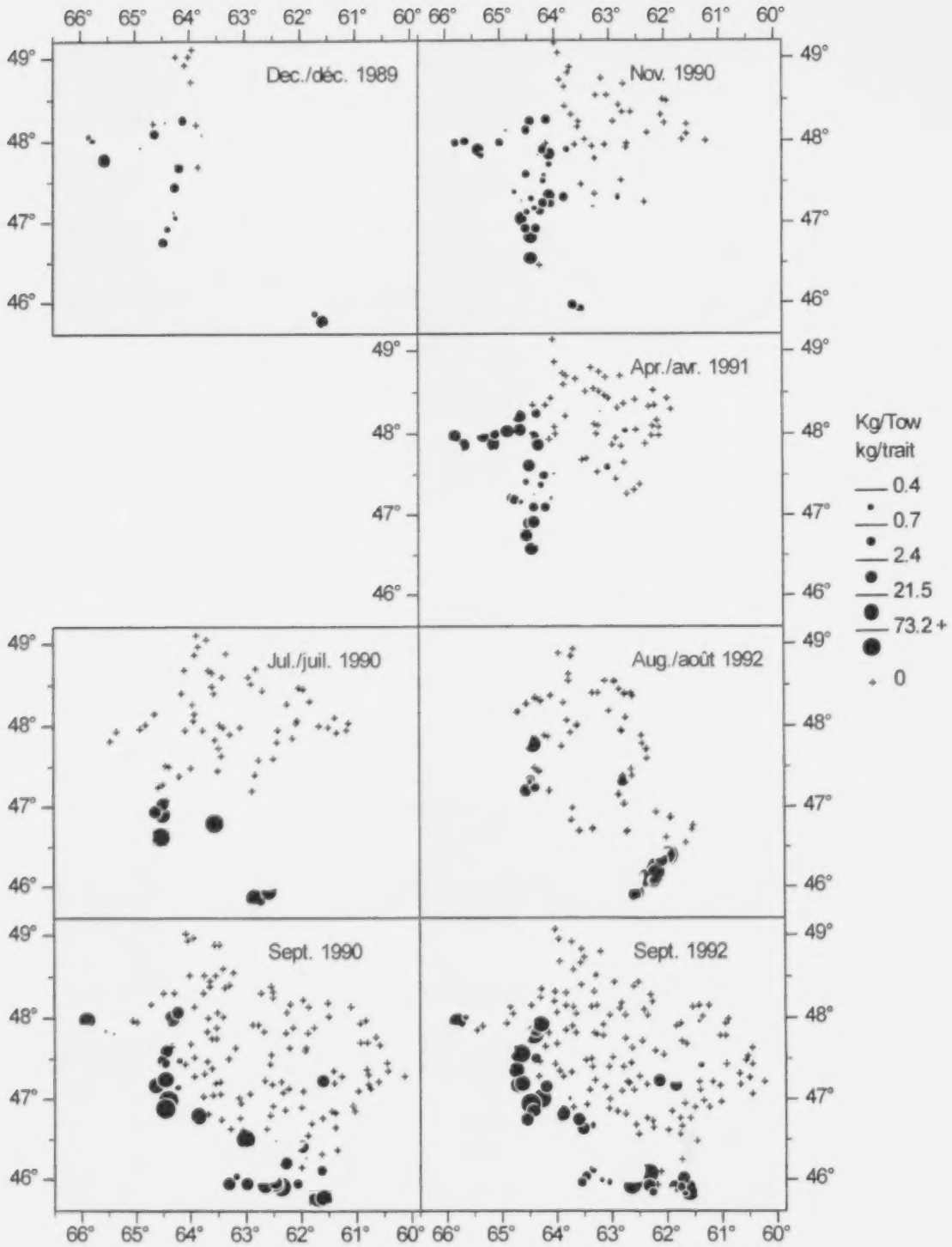

Figure 35b. S.W. Gulf of St. Lawrence seasonal distribution of catches (kg/tow) of Winter Flounder, *Pseudopleuronectes americanus*

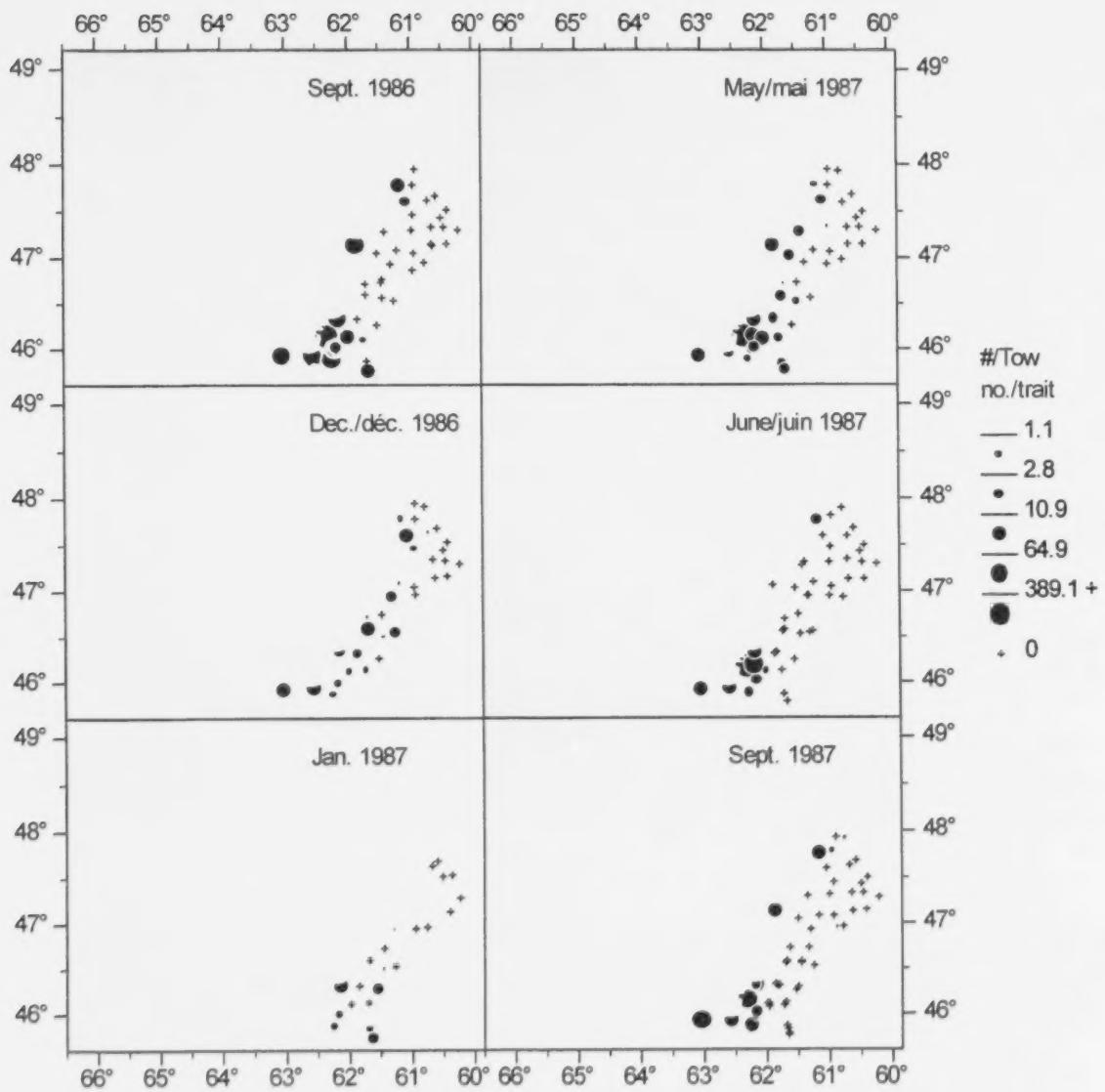

Figure 35c. S.E. Gulf of St. Lawrence seasonal distribution of catches (#/tow) of Winter Flounder, *Pseudopleuronectes americanus*

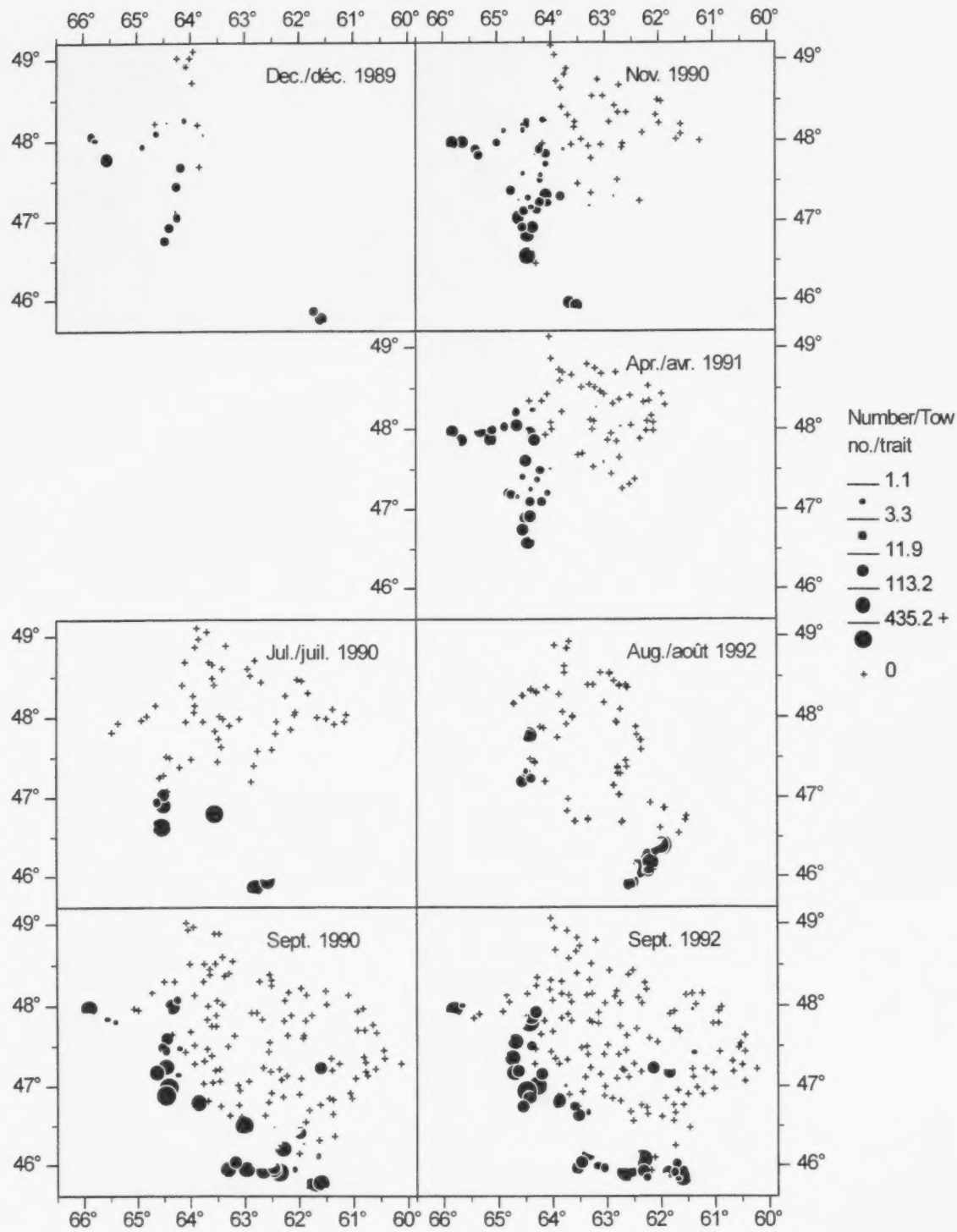

Figure 35d. S.W. Gulf of St. Lawrence seasonal distribution of catches (#/tow) of Winter Flounder, *Pseudopleuronectes americanus*

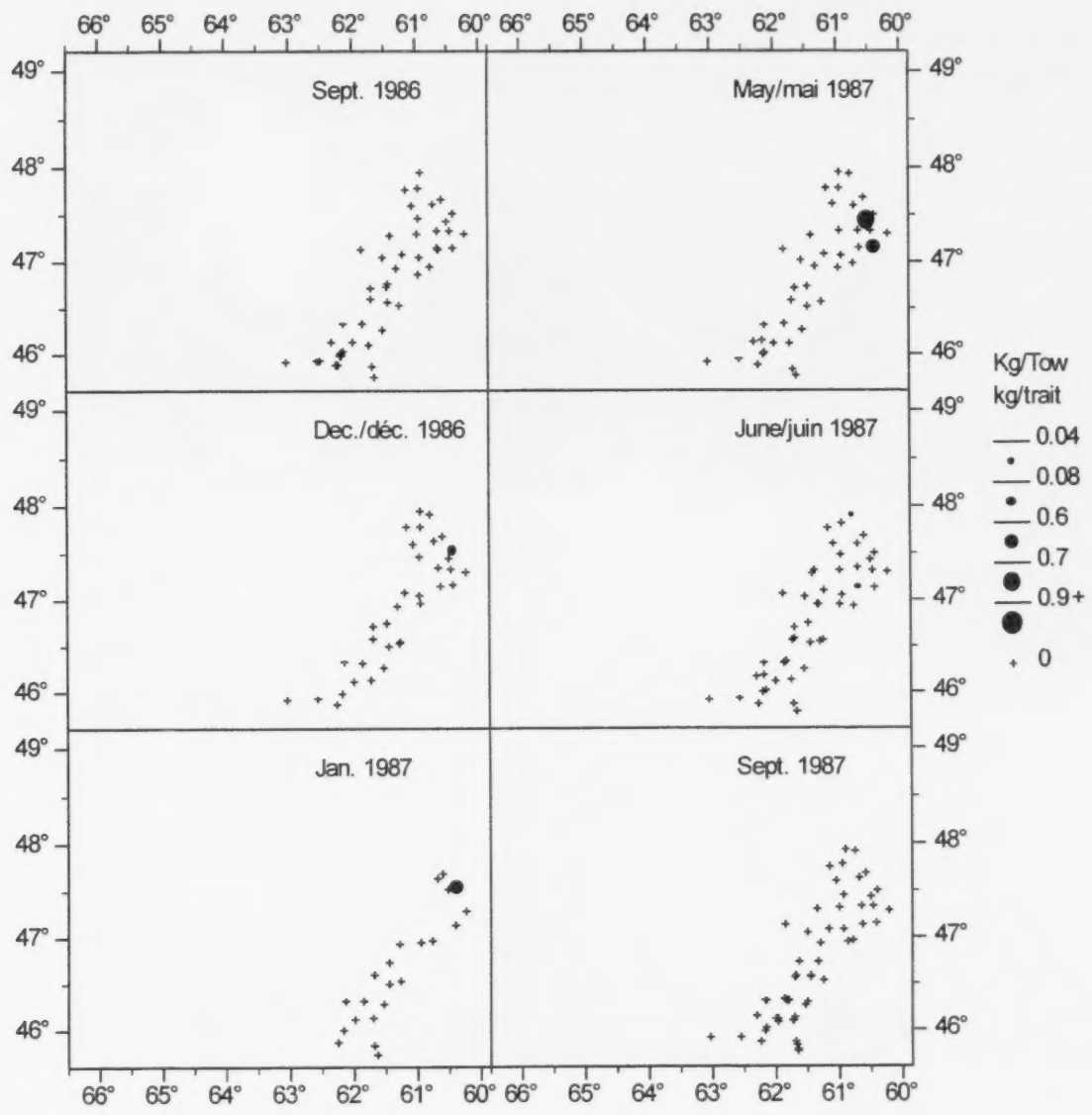

Figure 36a. S.E. Gulf of St. Lawrence seasonal distribution of catches (kg/tow) of Greendland Halibut, *Reinhardtius hippoglossoides*

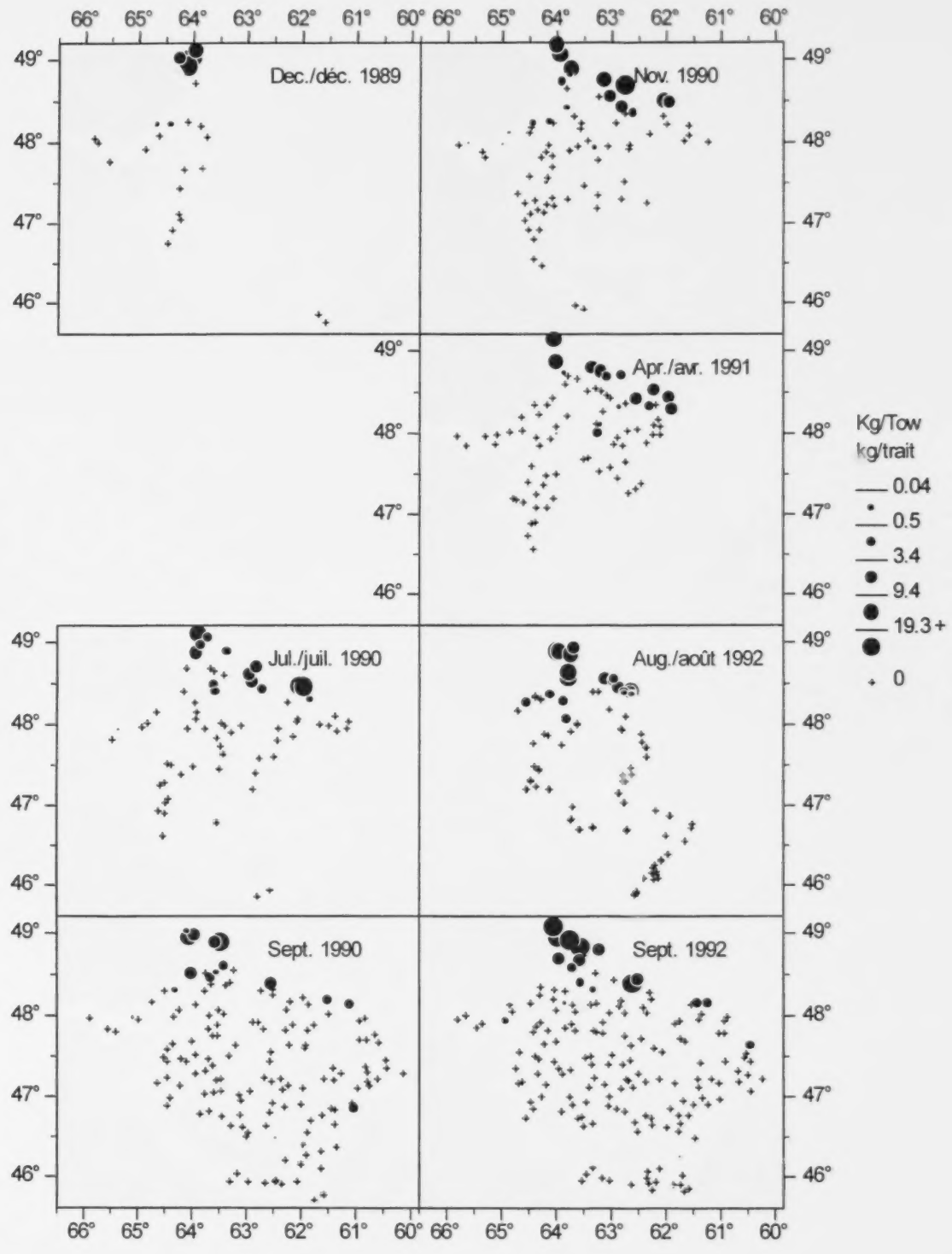

Figure 36b. S.W. Gulf of St. Lawrence seasonal distribution of catches (kg/tow) of Greendland Halibut, *Reinhardtius hippoglossoides*

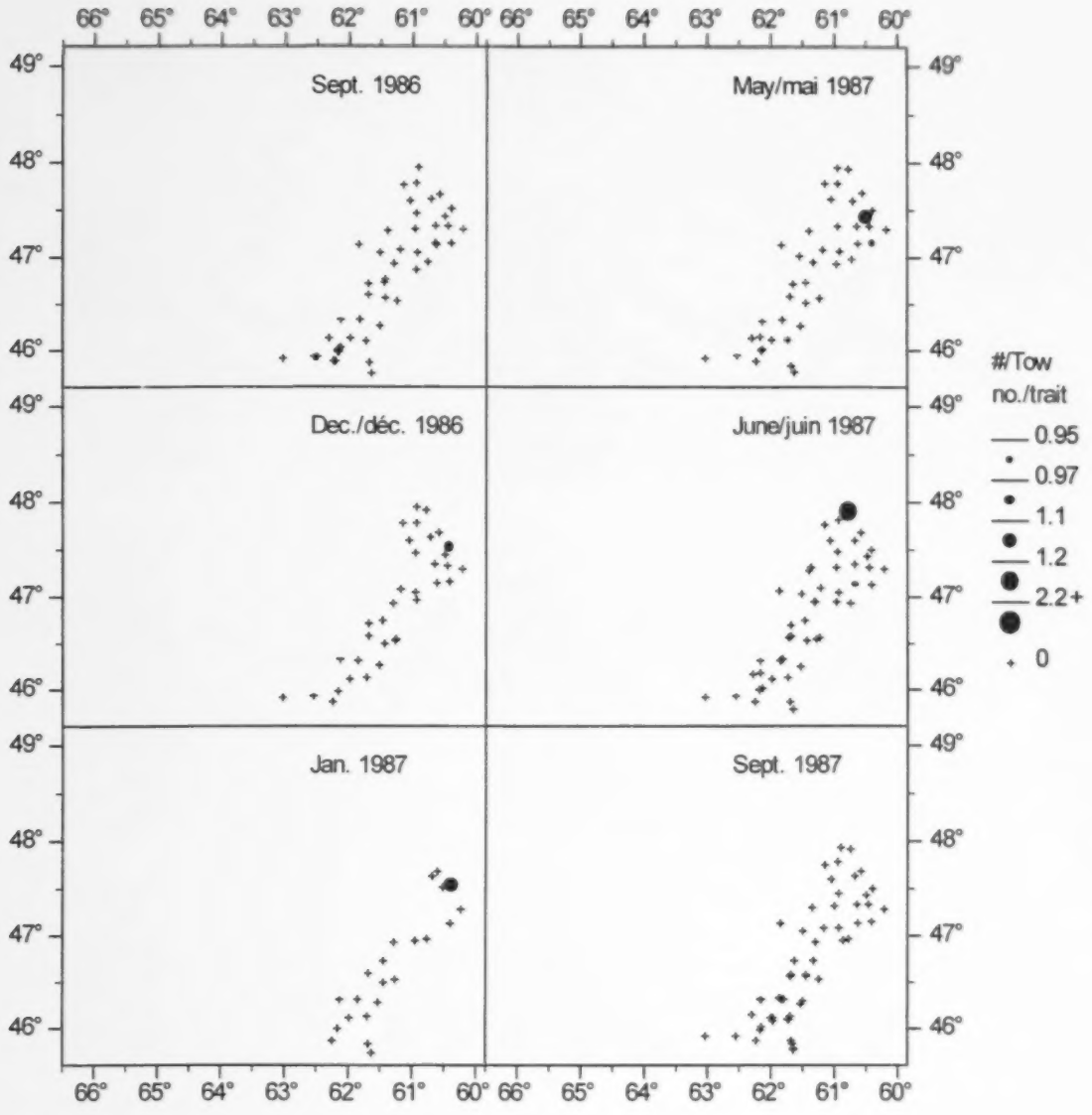

Figure 36c. S.E. Gulf of St. Lawrence seasonal distribution of catches (#/tow) of Greendland Halibut, *Reinhardtius hippoglossoides*

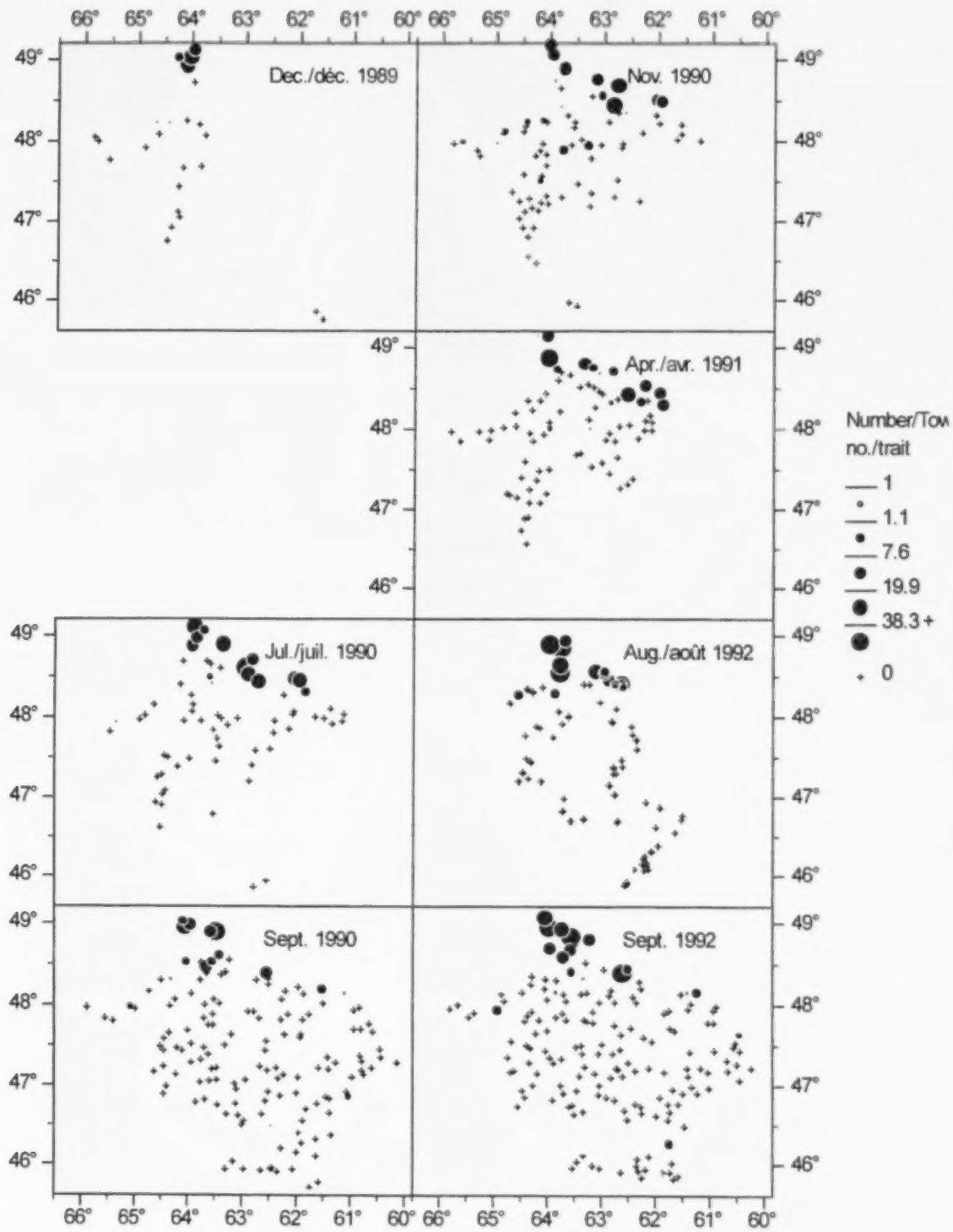

Figure 36d. S.W. Gulf of St. Lawrence seasonal distribution of catches (#/tow) of Greendland Halibut, *Reinhardtius hippoglossoides*

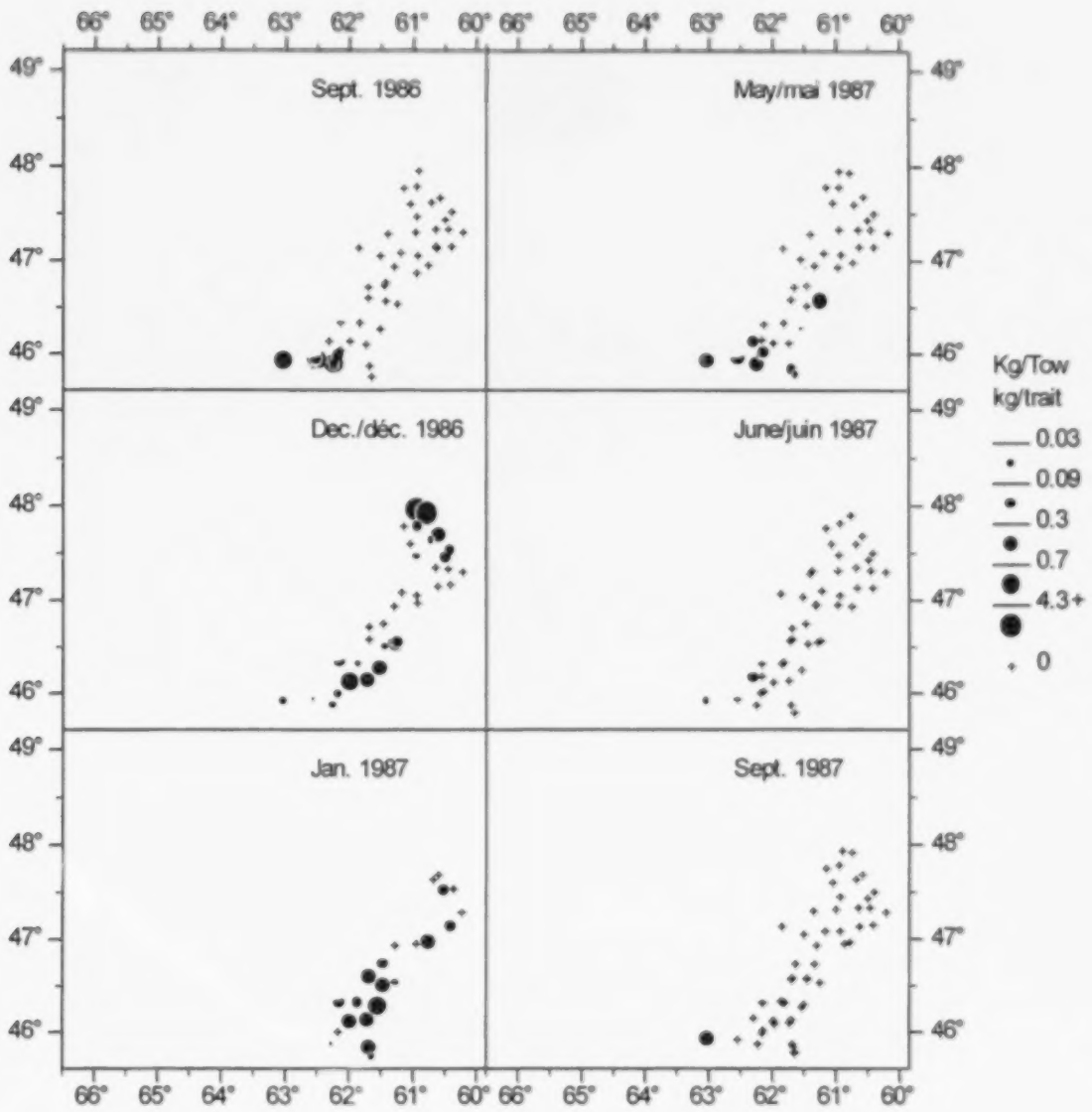

Figure 37a. S.E. Gulf of St. Lawrence seasonal distribution of catches (kg/tow) of Windowpane, *Scophthalmus aquosus*

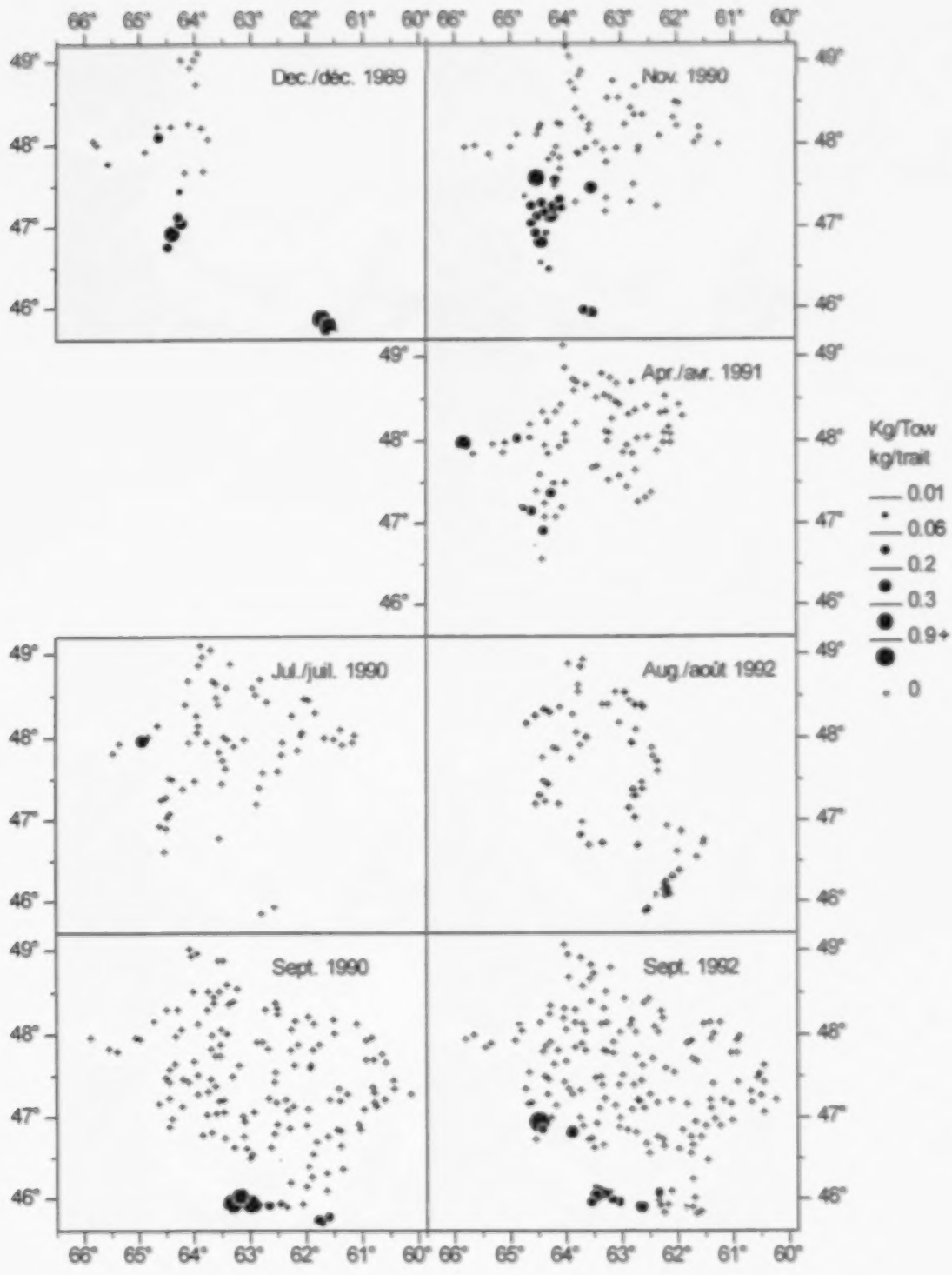

Figure 37b. S.W. Gulf of St. Lawrence seasonal distribution of catches (kg/tow) of Windowpane, *Scophthalmus aquosus*

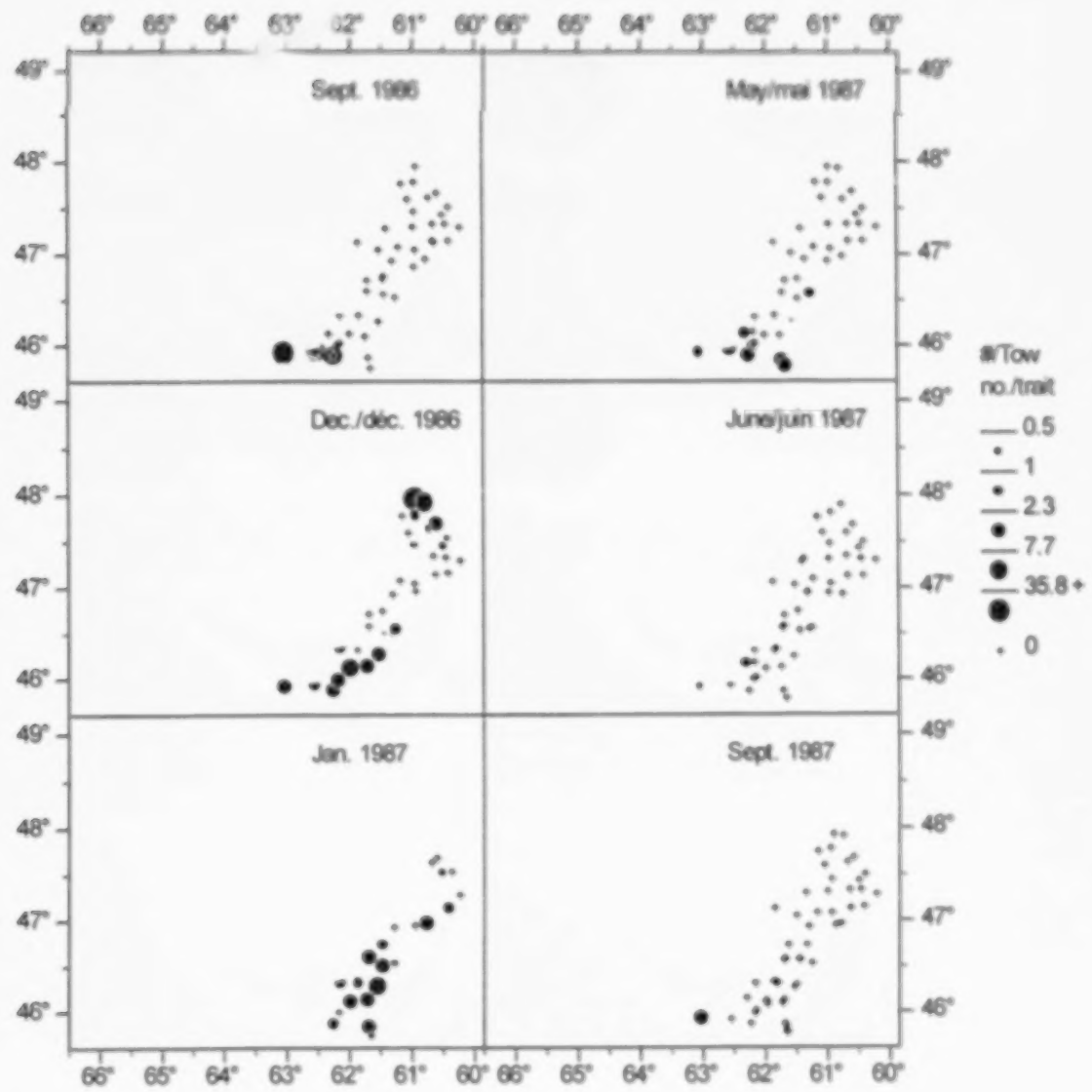

Figure 37c. S.E. Gulf of St. Lawrence seasonal distribution of catches (#/tow) of Windowpane, *Scophthalmus aquosus*

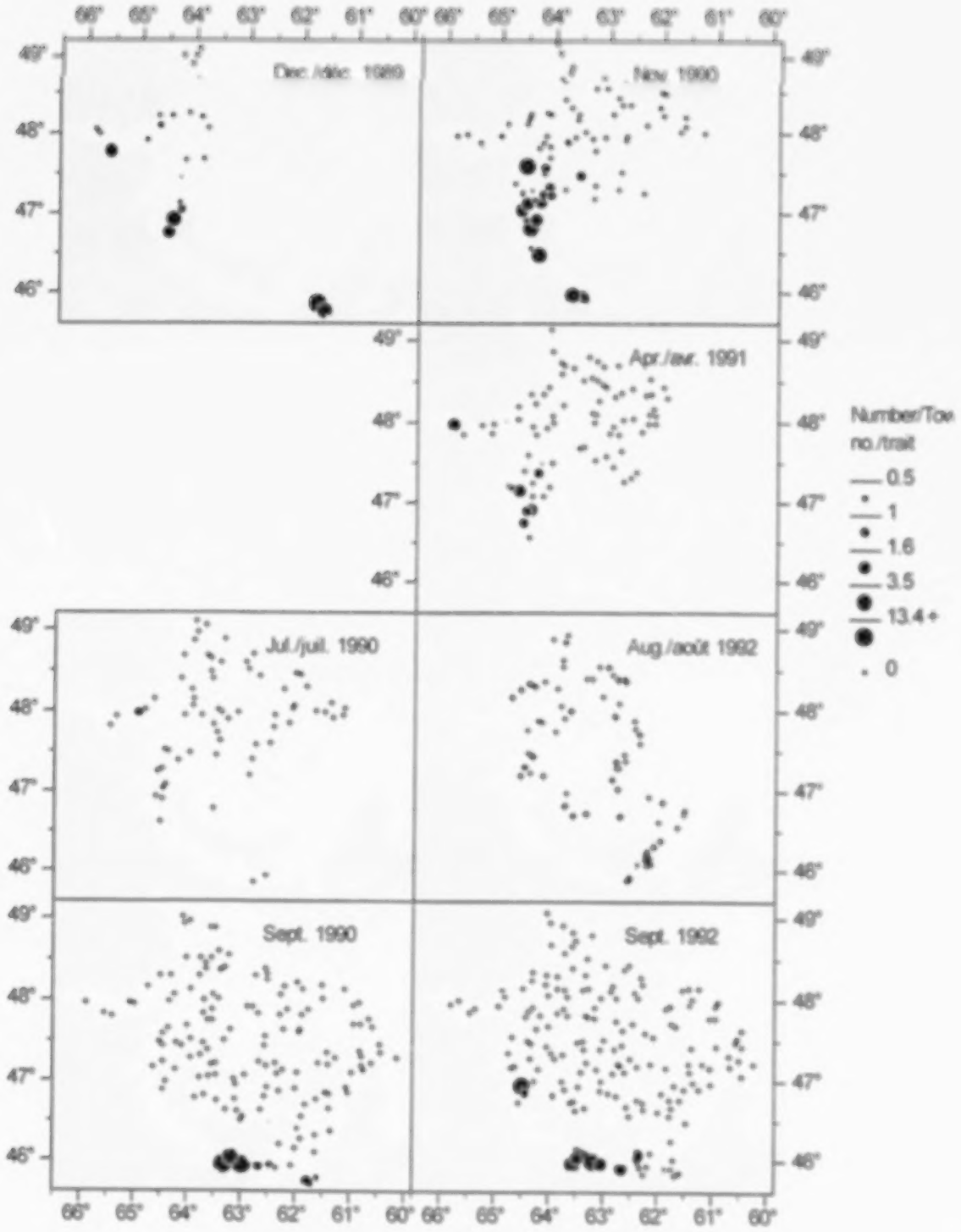

Figure 37d. S.W. Gulf of St. Lawrence seasonal distribution of catches (#/tow) of Windowpane, *Scophthalmus aquosus*

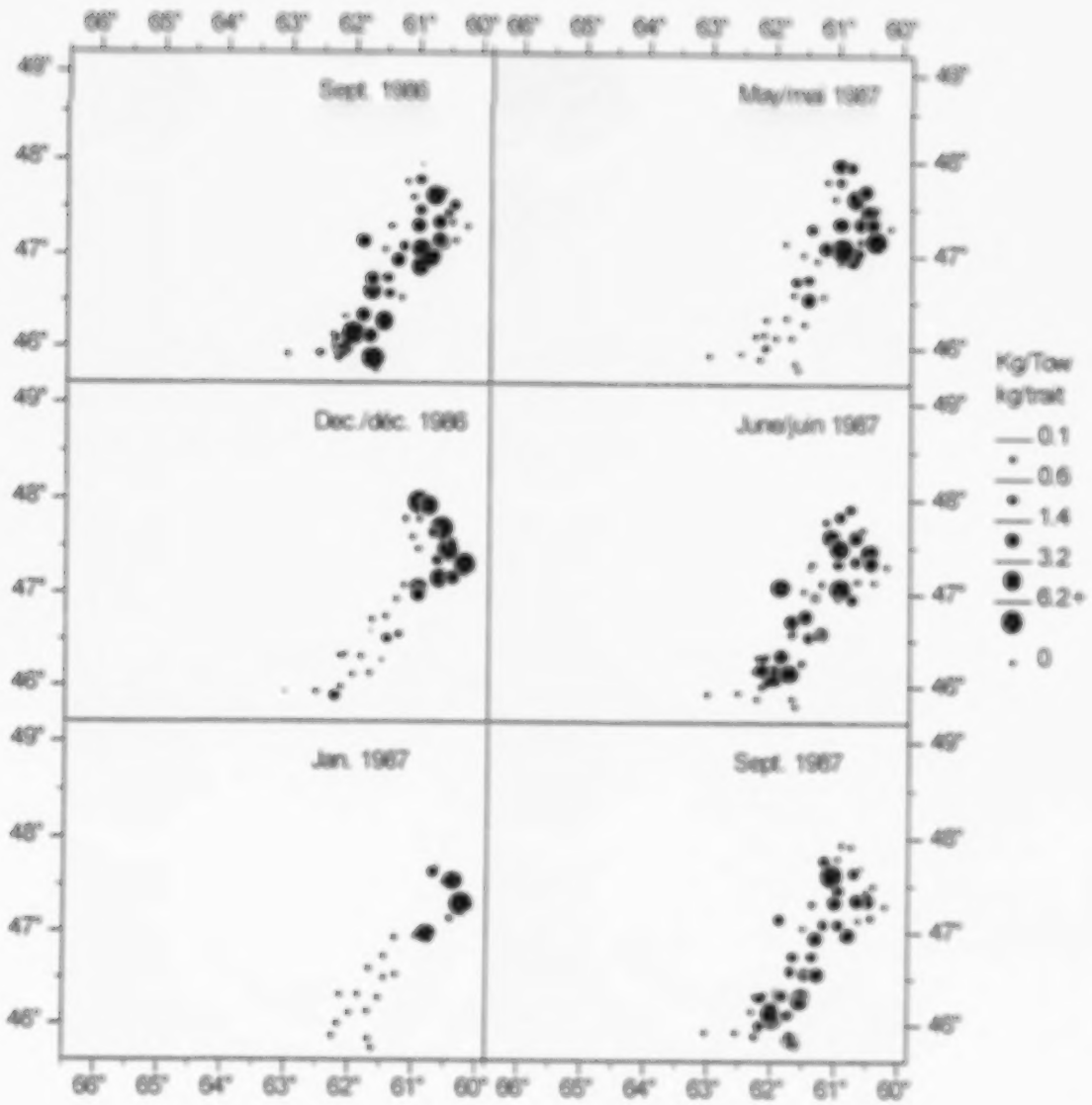

Figure 38a. S.E. Gulf of St. Lawrence seasonal distribution of catches (kg/tow) of Thorny Skate, *Amblyraja radiata*

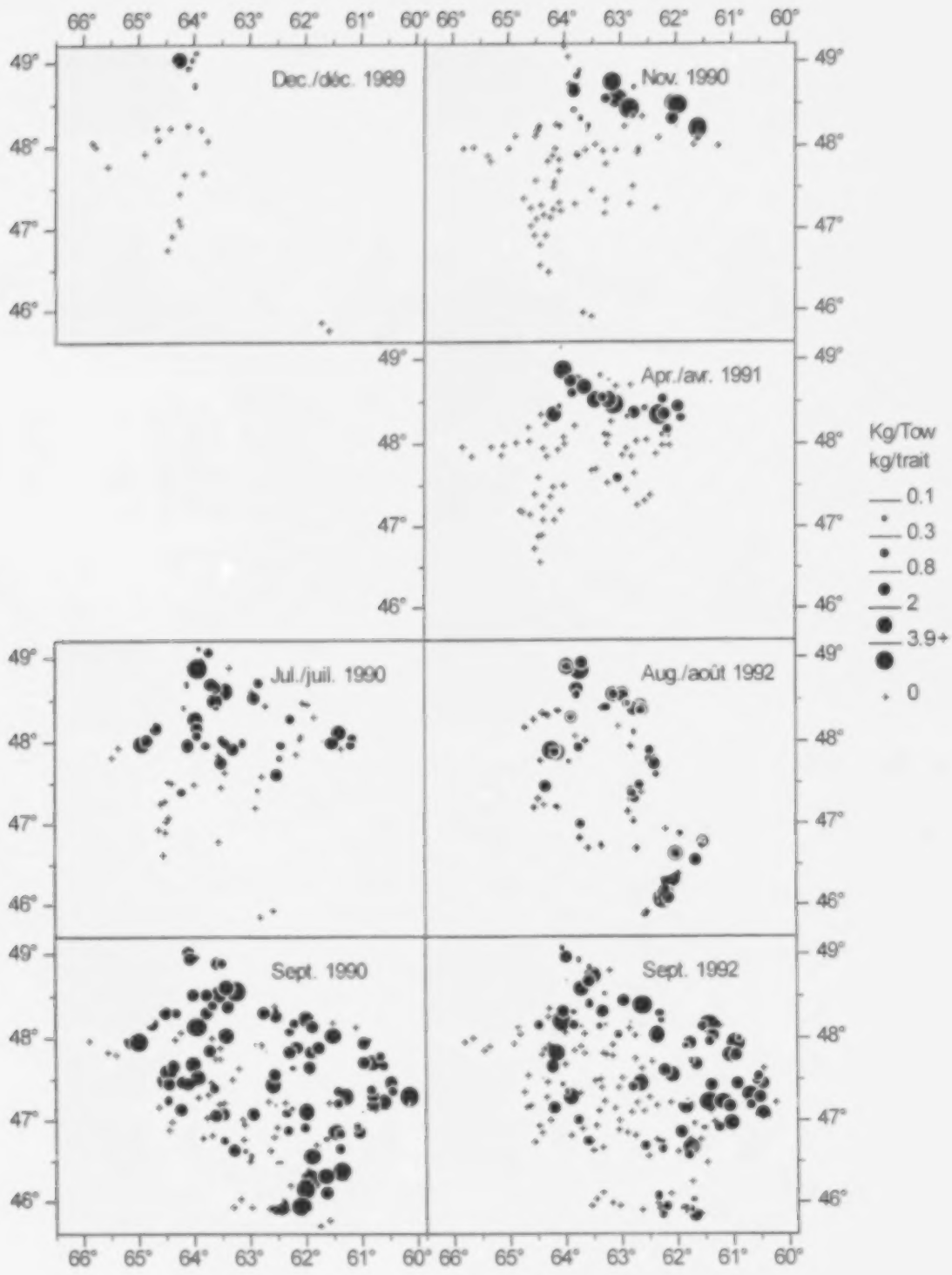

Figure 38b. S.W. Gulf of St. Lawrence seasonal distribution of catches (kg/tow) of Thorny Skate, *Amblyraja radiata*

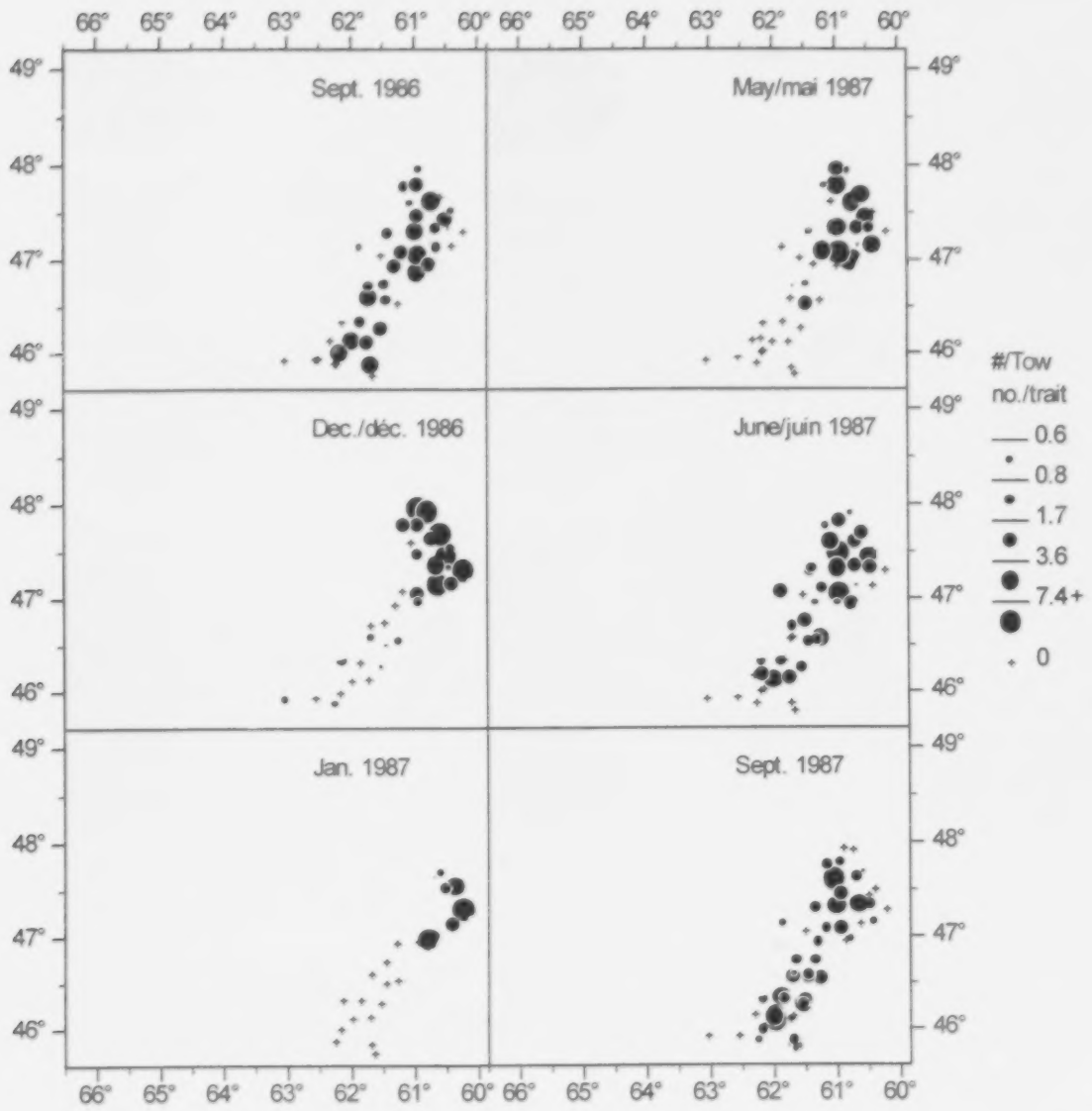

Figure 38c. S.E. Gulf of St. Lawrence seasonal distribution of catches (#/tow) of Thorny Skate, *Amblyraja radiata*

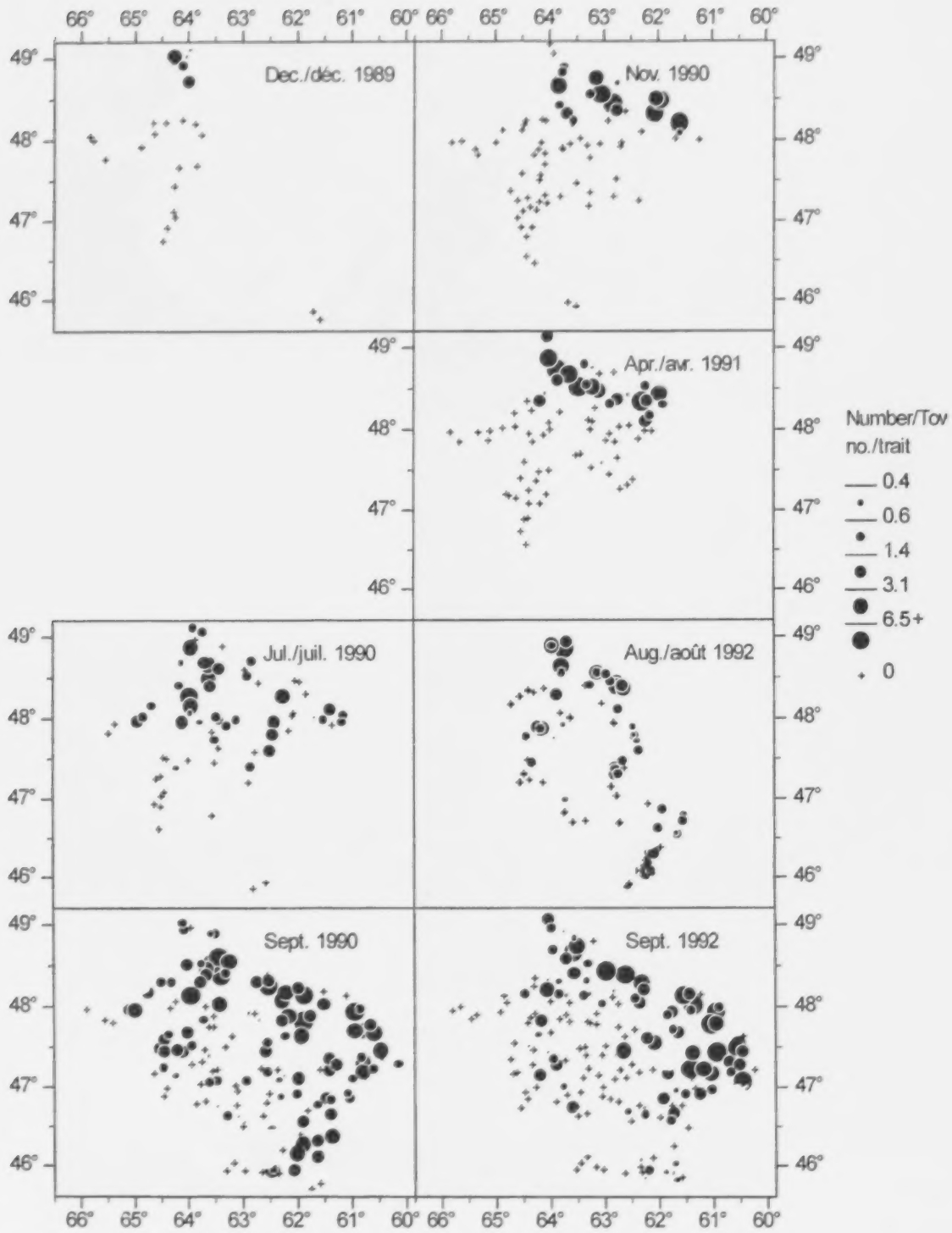

Figure 38d. S.W. Gulf of St. Lawrence seasonal distribution of catches (#/tow) of Thorny Skate, *Amblyraja radiata*

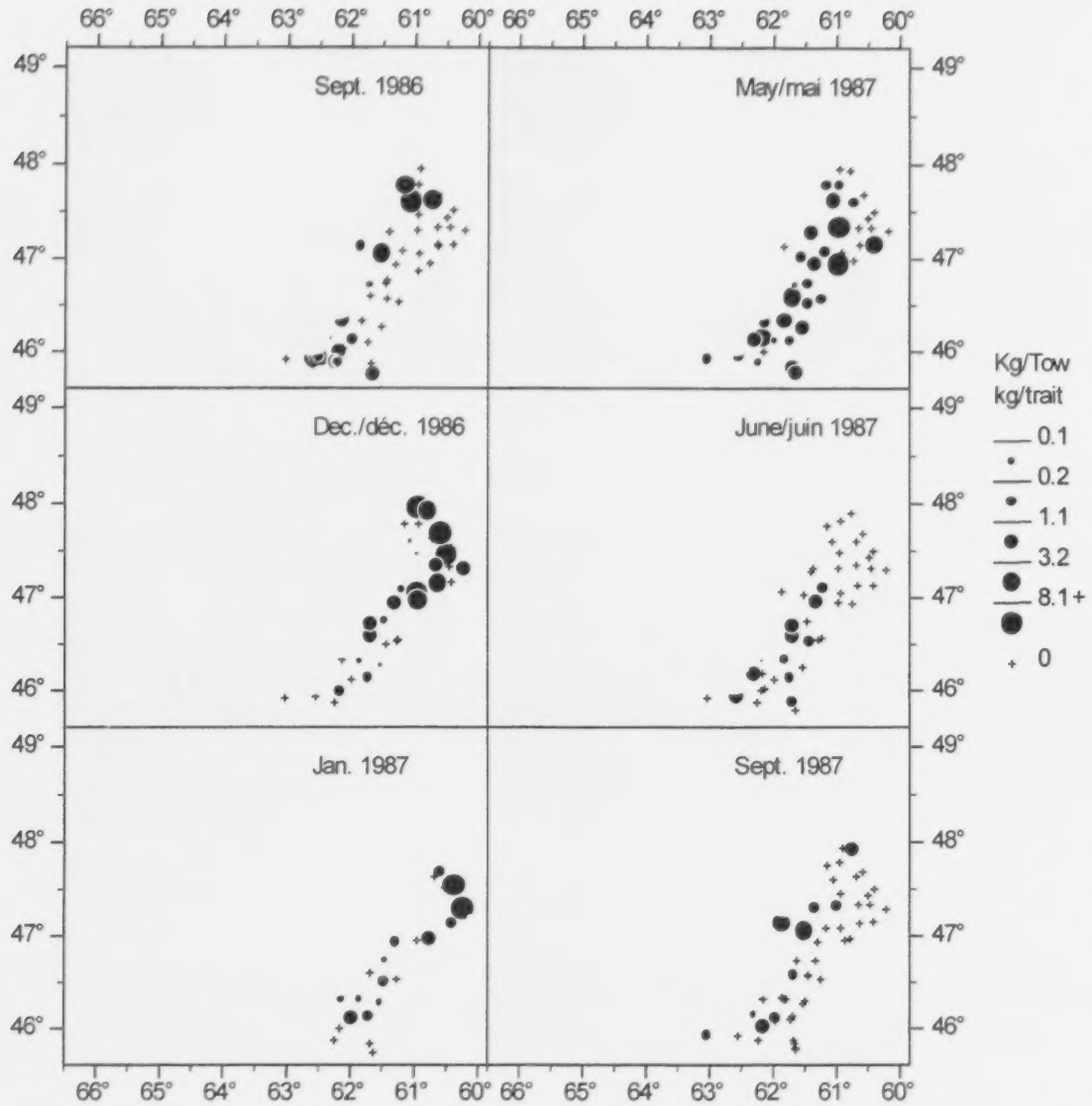

Figure 39a. S.E. Gulf of St. Lawrence seasonal distribution of catches (kg/tow) of Winter Skate, *Leucoraja ocellata*

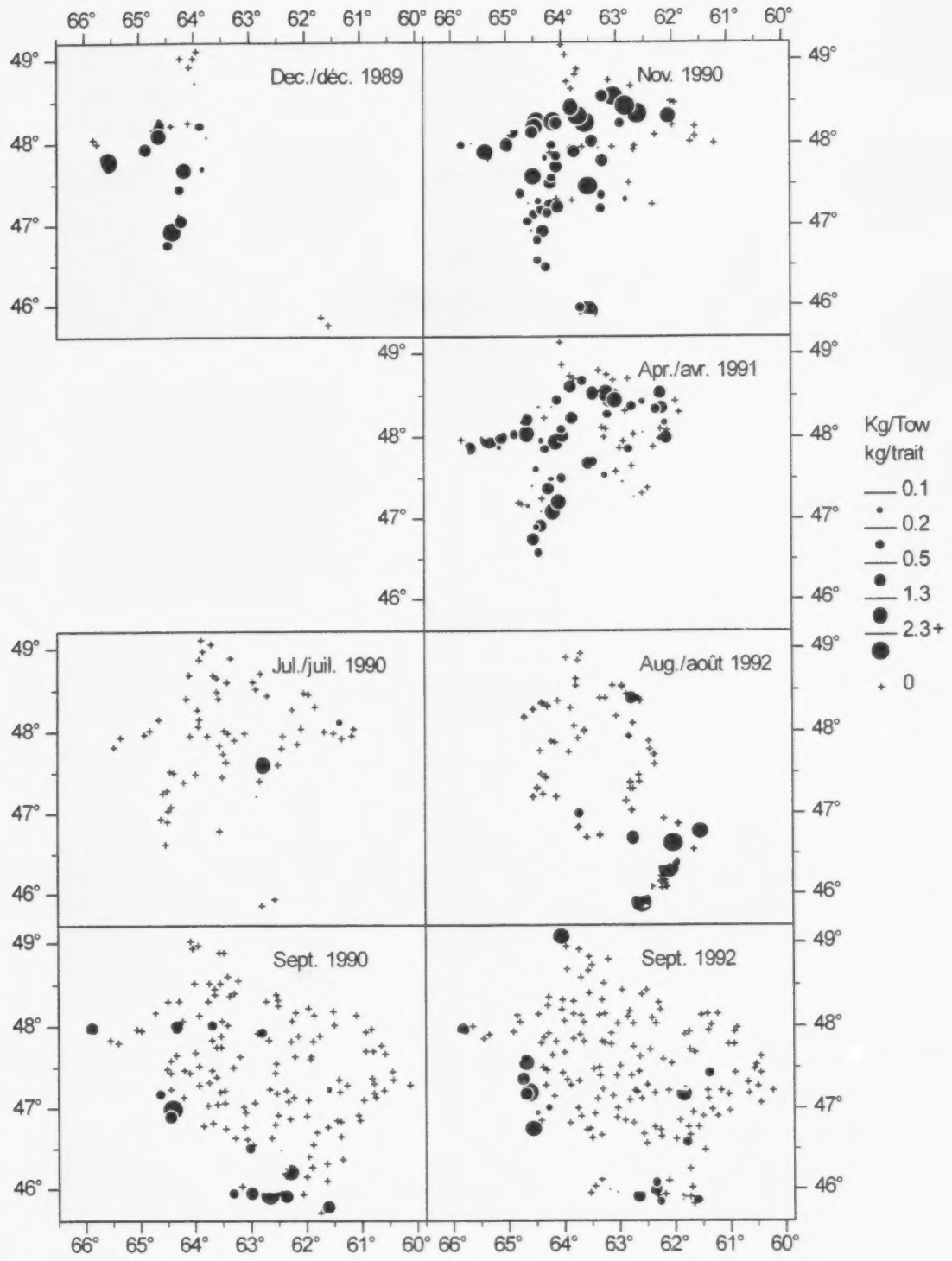

Figure 39b. S.W. Gulf of St. Lawrence seasonal distribution of catches (kg/tow) of Winter Skate, *Leucoraja ocellata*

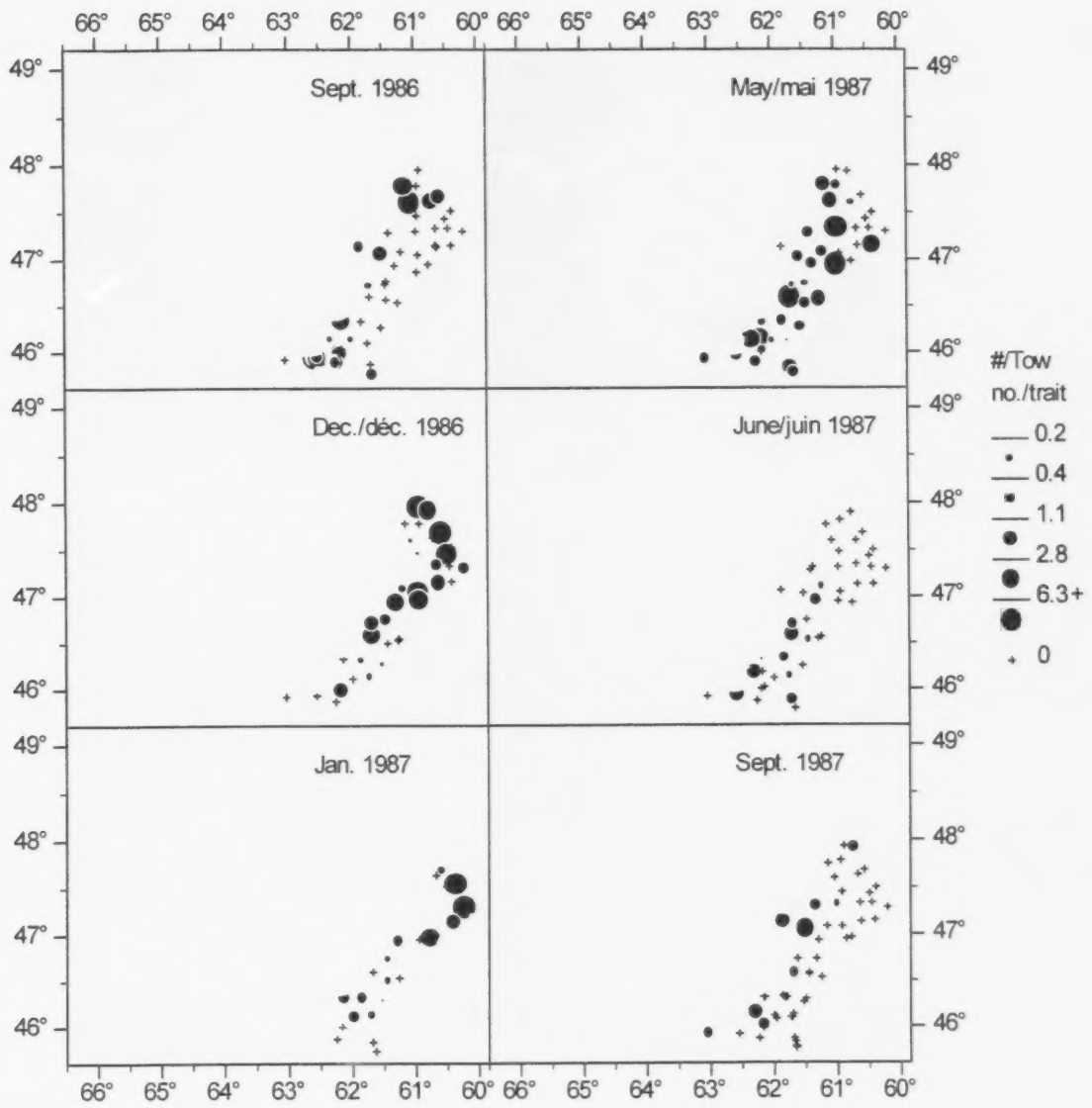

Figure 39c. S.E. Gulf of St. Lawrence seasonal distribution of catches (#/tow) of Winter Skate, *Leucoraja ocellata*

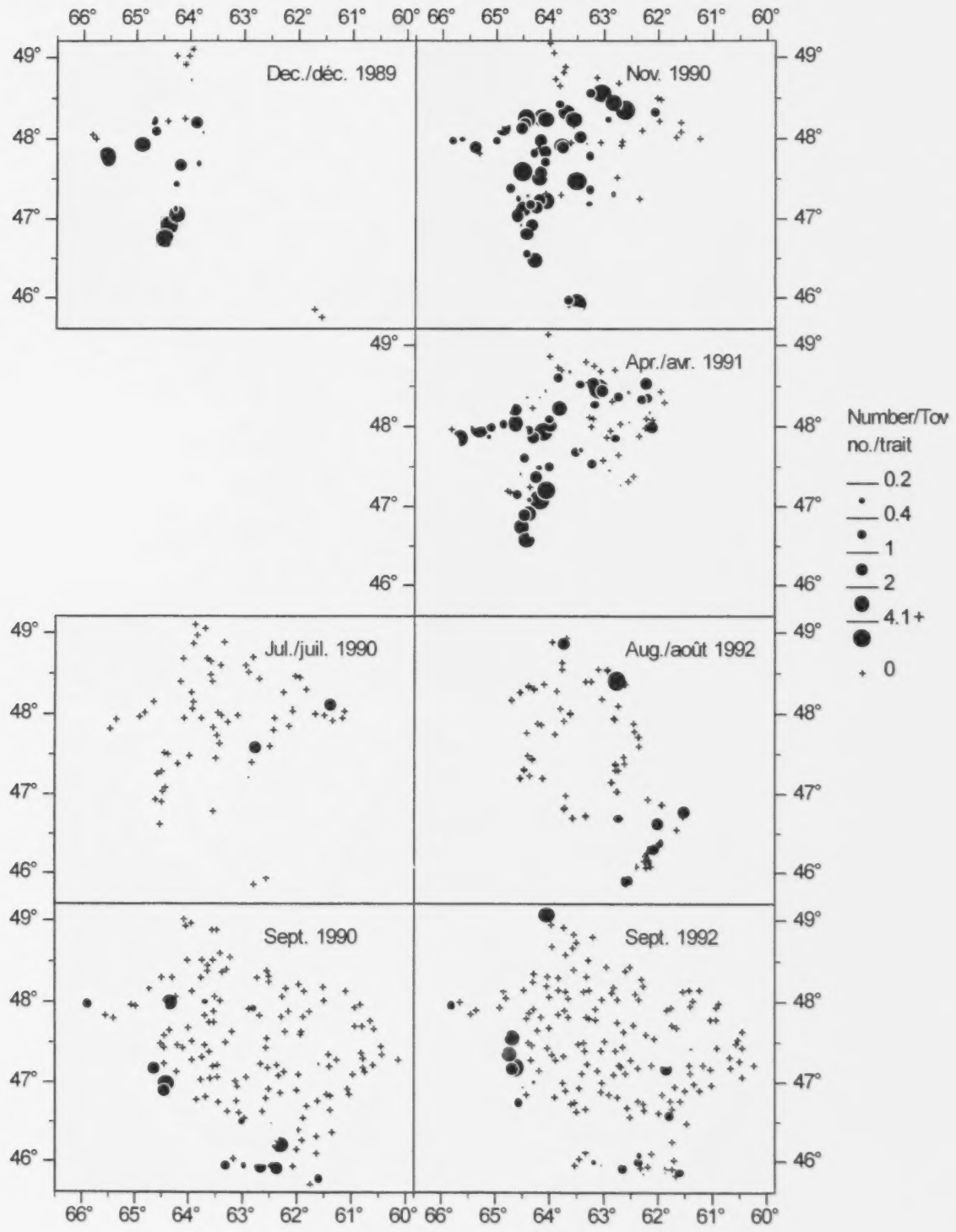

Figure 39d. S.W. Gulf of St. Lawrence seasonal distribution of catches (#/tow) of Winter Skate, *Leucoraja ocellata*

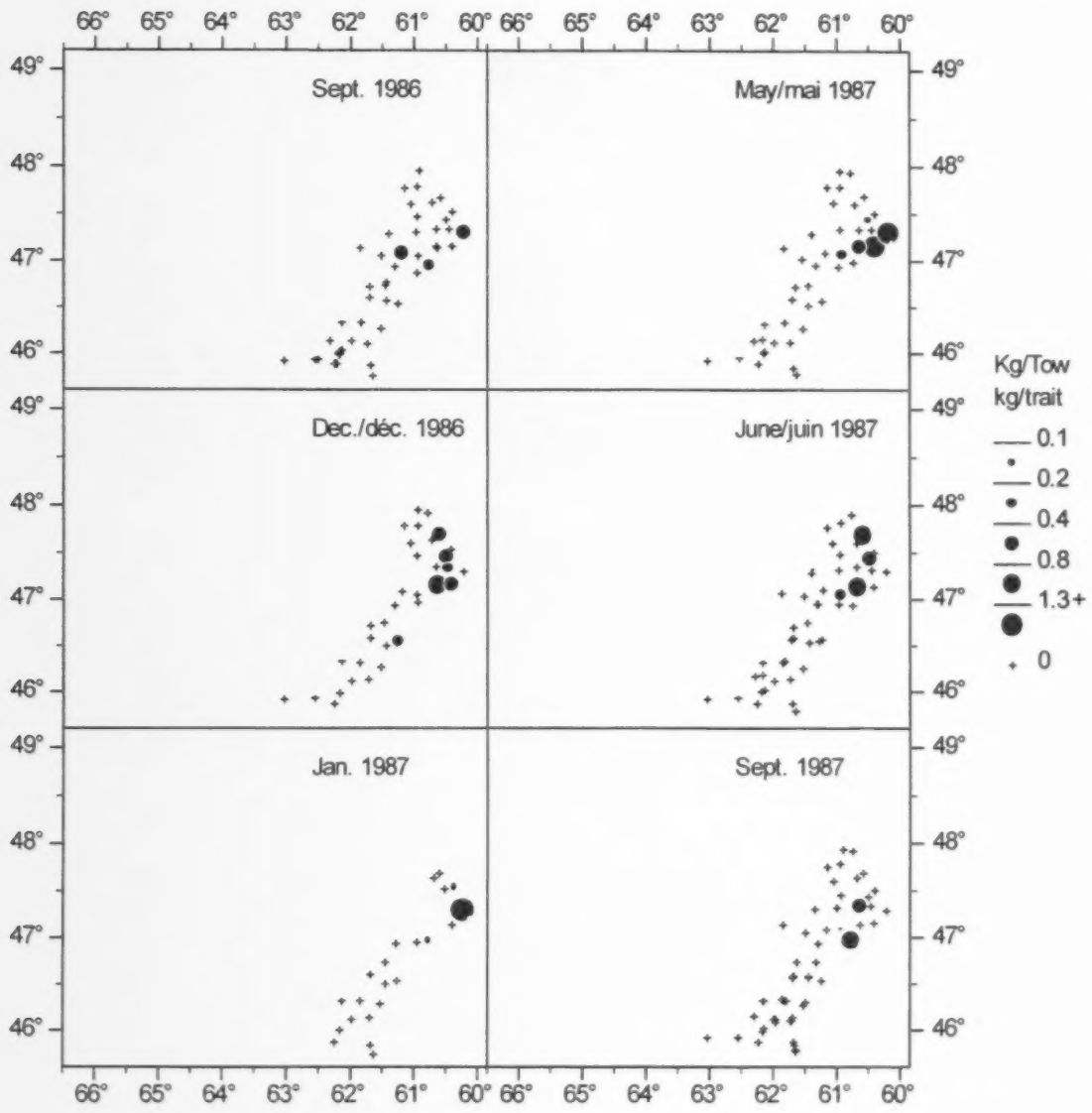

Figure 40a. S.E. Gulf of St. Lawrence seasonal distribution of catches (kg/tow) of Smooth Skate, *Malacoraja senta*

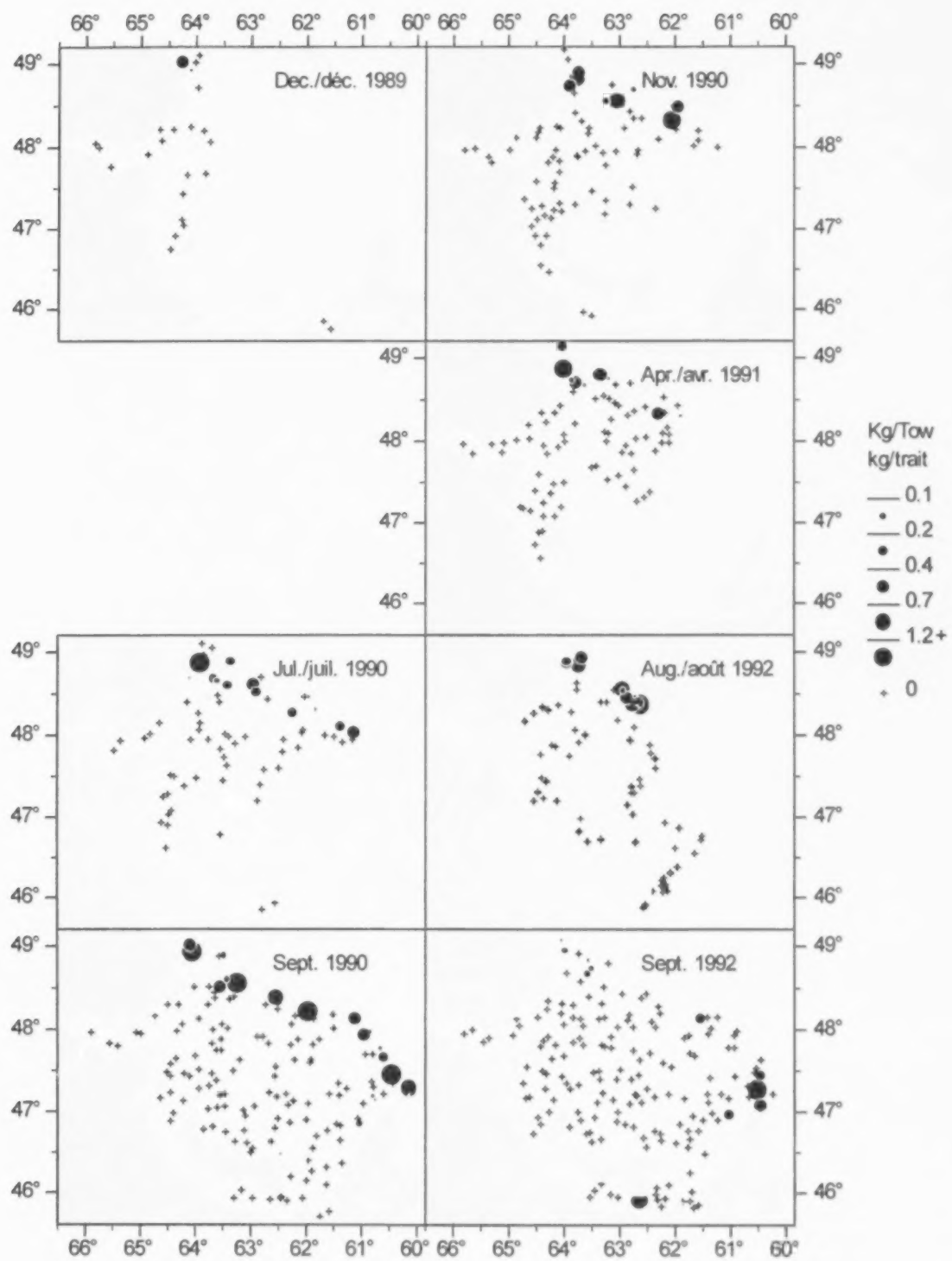

Figure 40b. S.W. Gulf of St. Lawrence seasonal distribution of catches (kg/tow) of Smooth Skate, *Malacoraja senta*

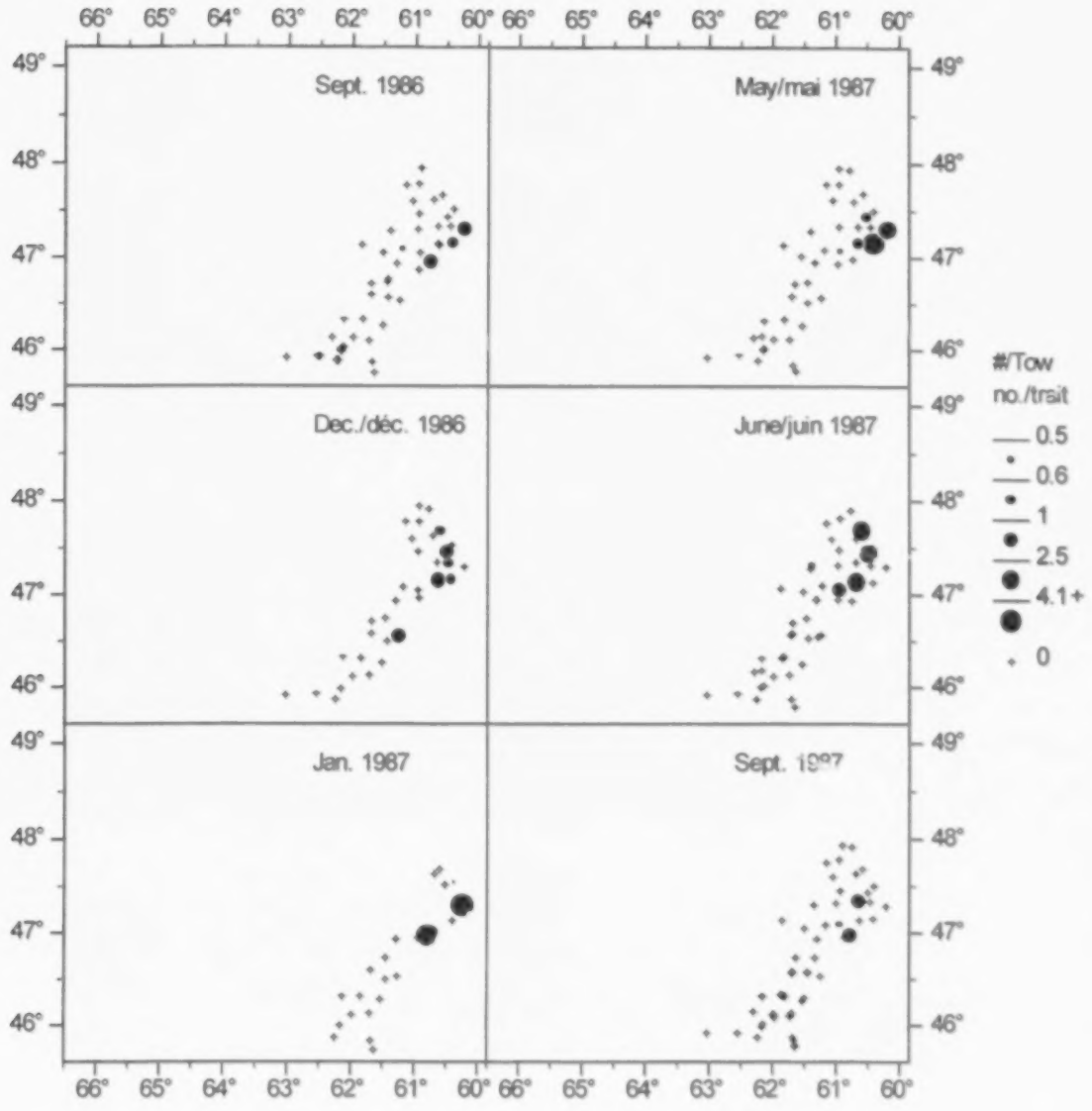

Figure 40c. S.E. Gulf of St. Lawrence seasonal distribution of catches (#/tow) of Smooth Skate, *Malacoraja senta*

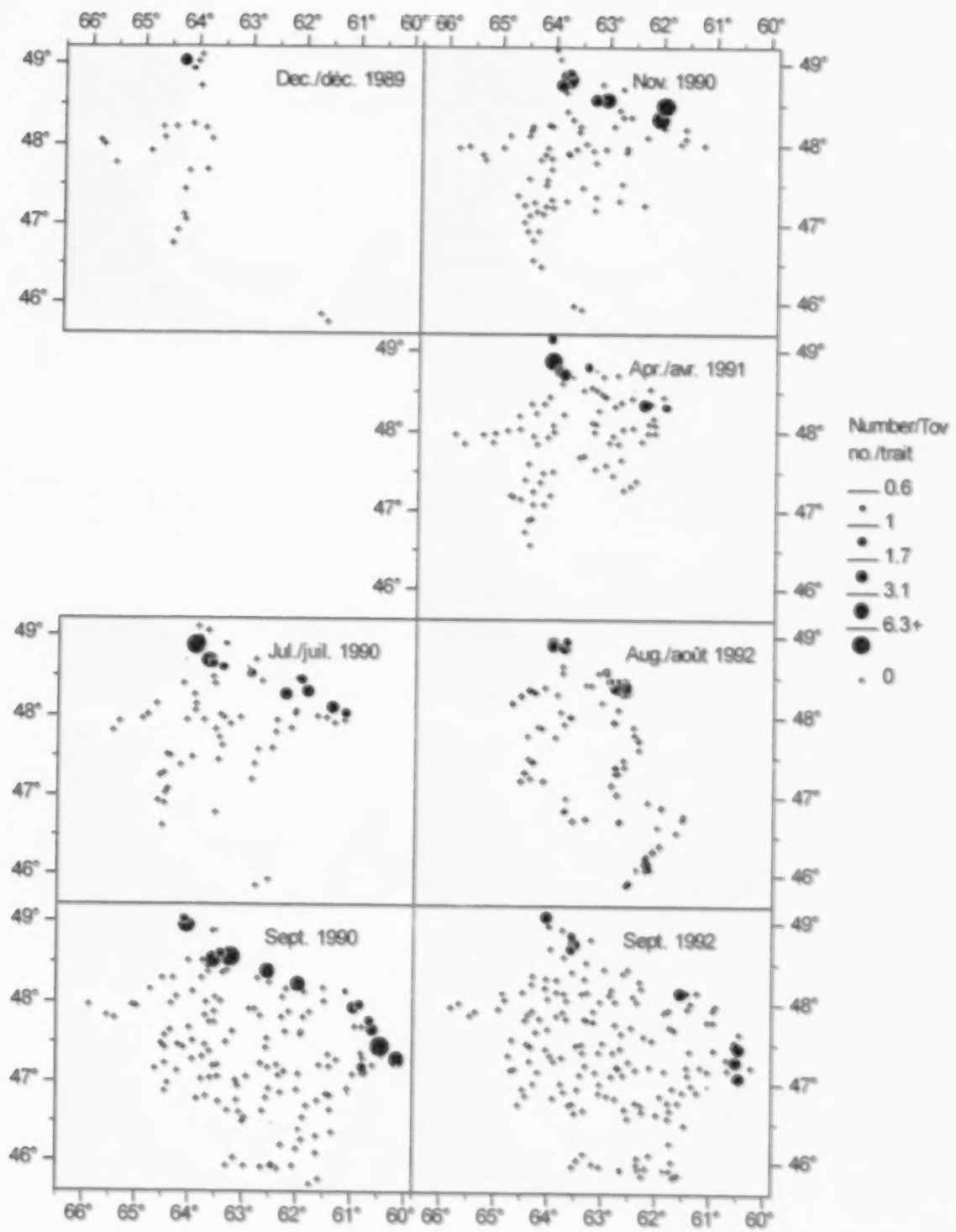

Figure 40d. S.W. Gulf of St. Lawrence seasonal distribution of catches (#/tow) of Smooth Skate, *Malacoraja senta*

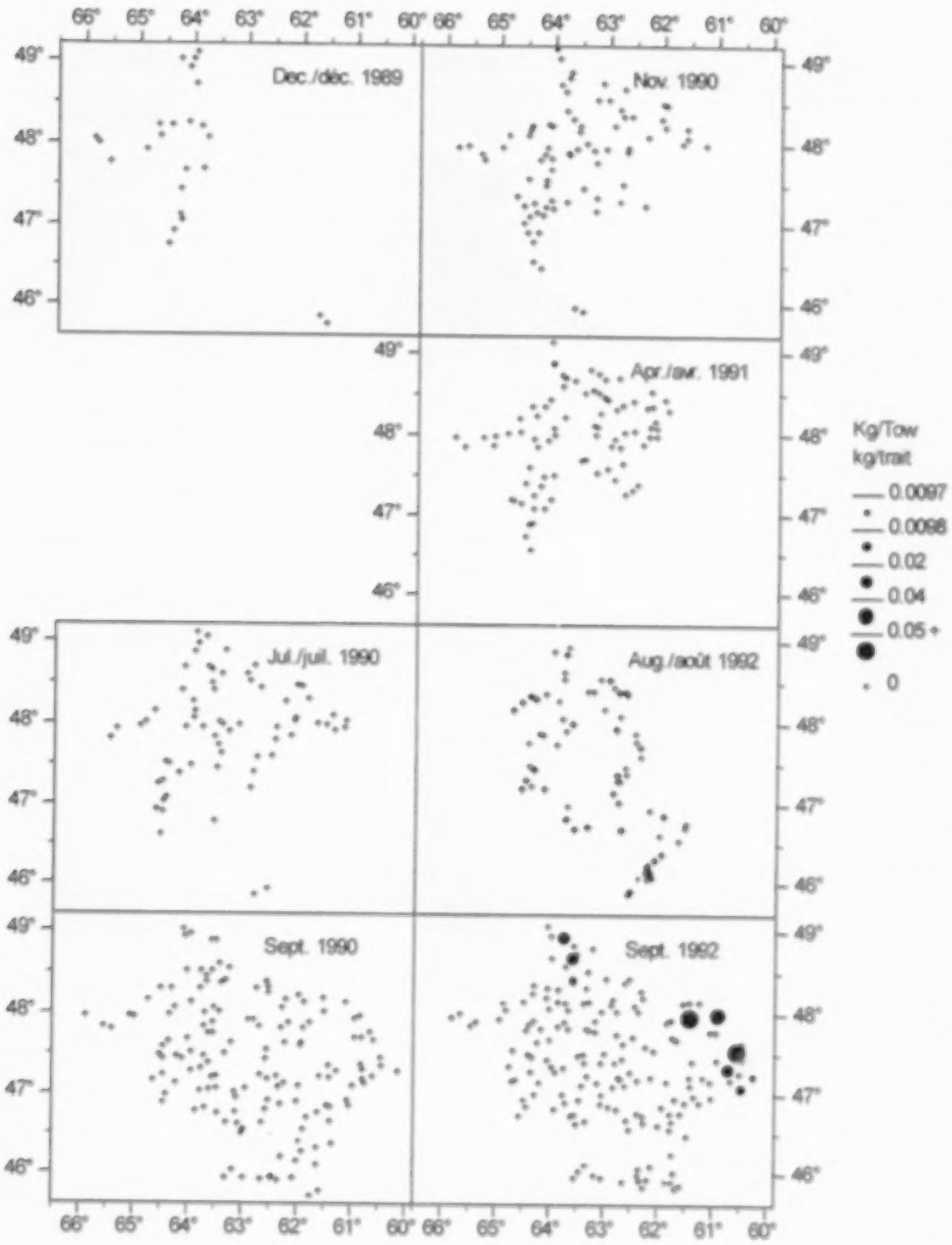

Figure 40e. S.W. Gulf of St. Lawrence seasonal distribution of catches (kg/tow) of Skate Egg Cases.

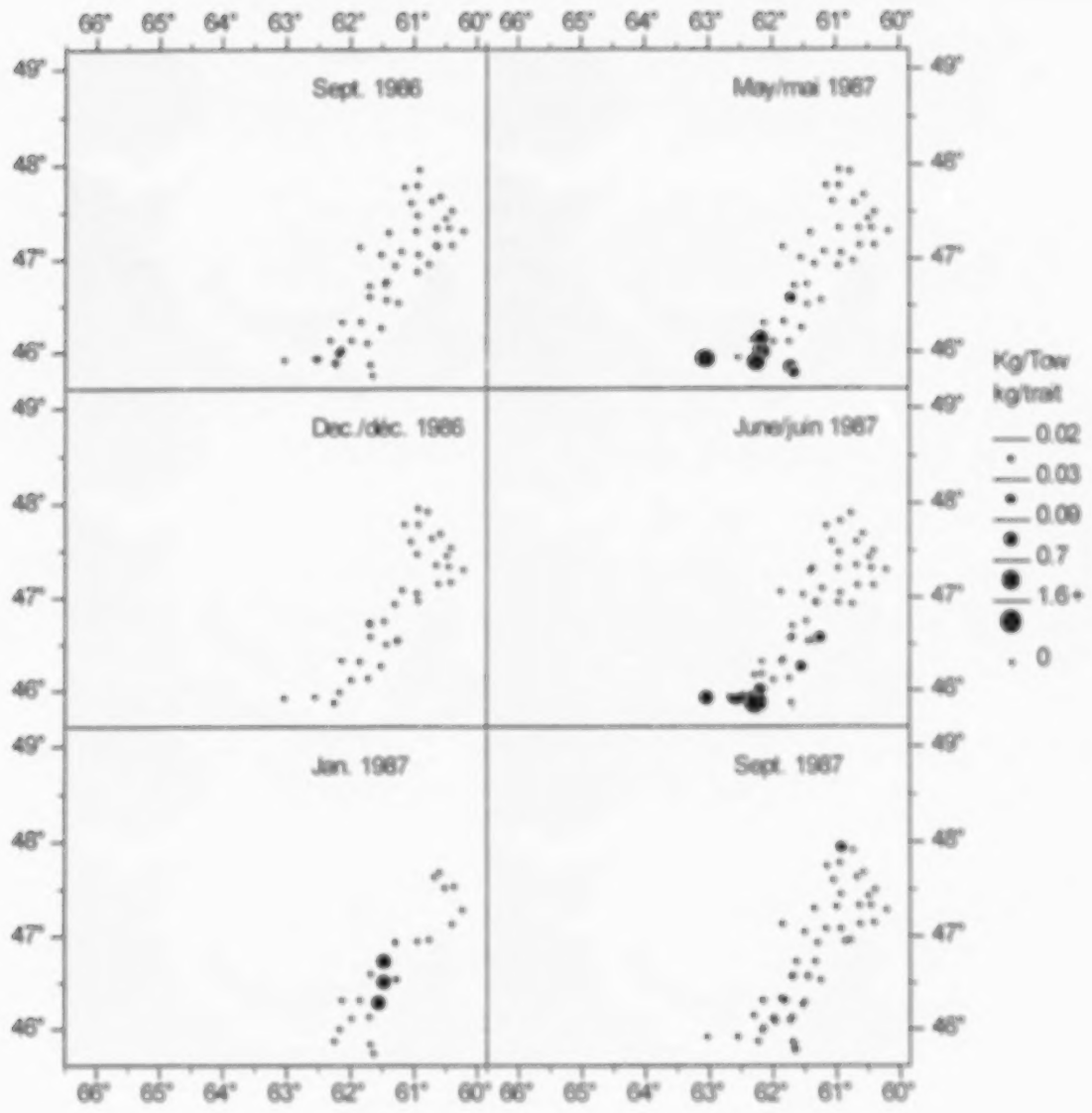

Figure 41a. S.E. Gulf of St. Lawrence seasonal distribution of catches (kg/tow) of Capelin, *Mallotus villosus*

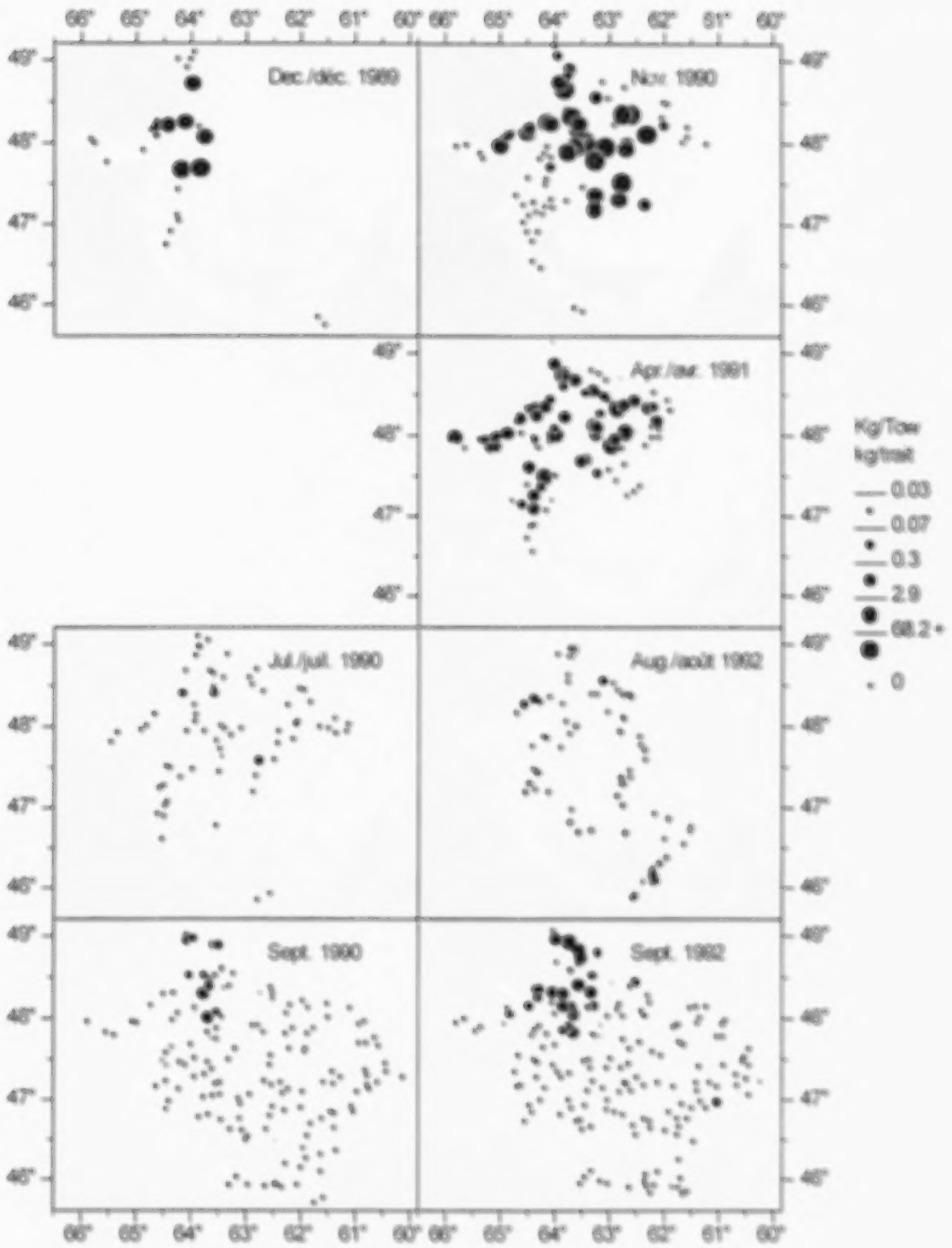

Figure 41b. S.W. Gulf of St. Lawrence seasonal distribution of catches (kg/tow) of Capelin, *Mallotus villosus*

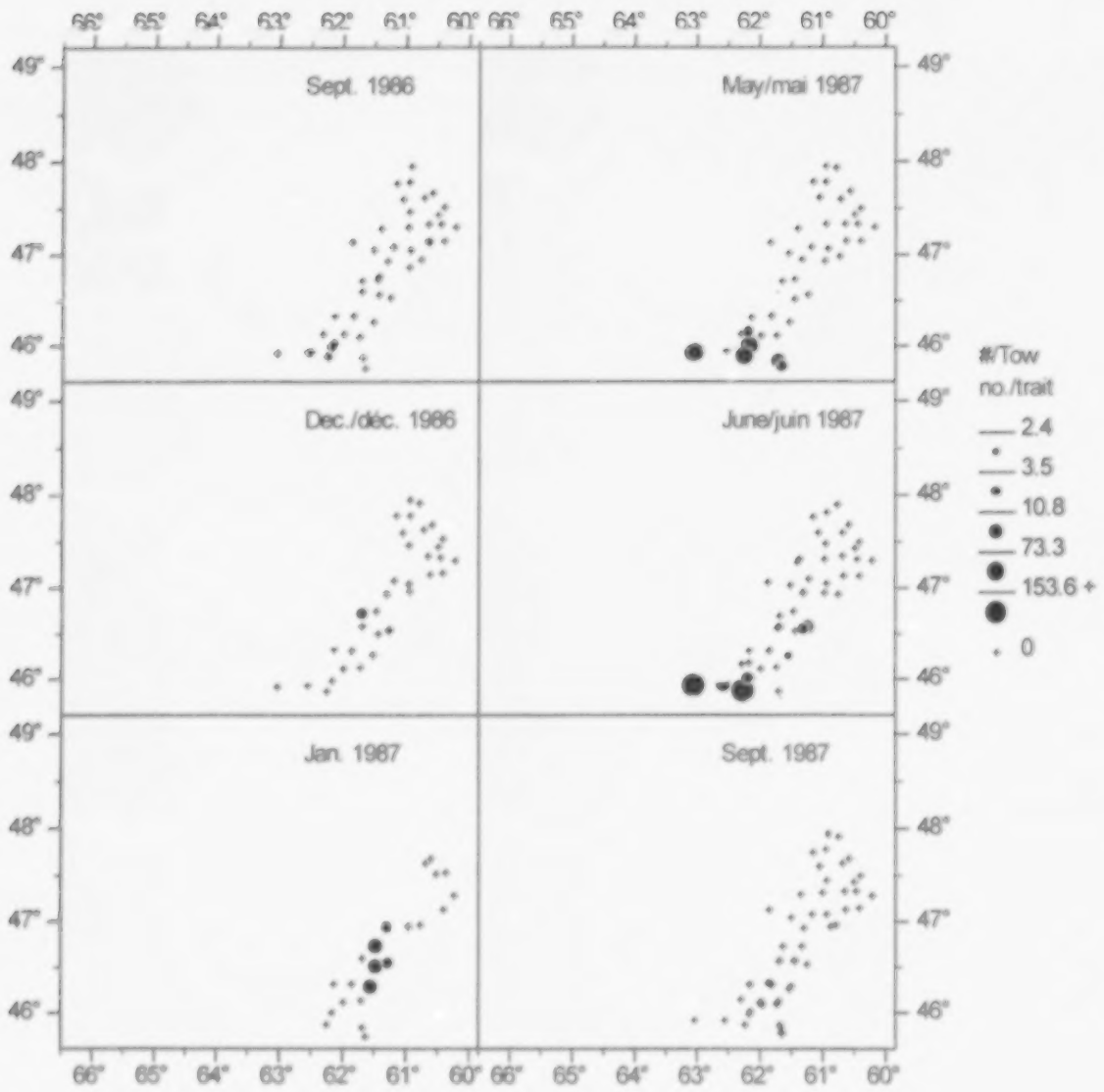

Figure 41c. S.E. Gulf of St. Lawrence seasonal distribution of catches (#/tow) of Capelin, *Mallotus villosus*

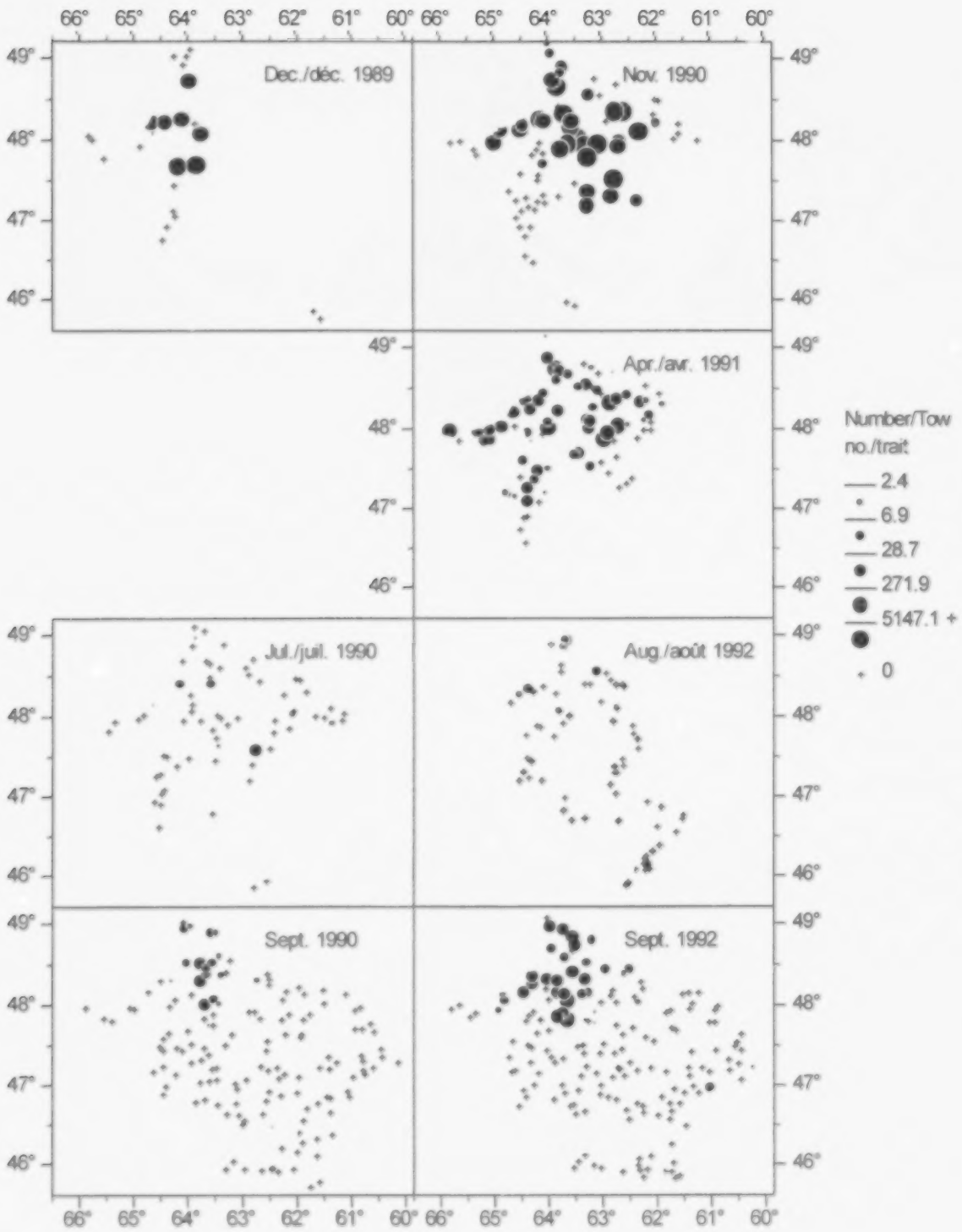

Figure 41d. S.W. Gulf of St. Lawrence seasonal distribution of catches (#/tow) of Capelin, *Mallotus villosus*

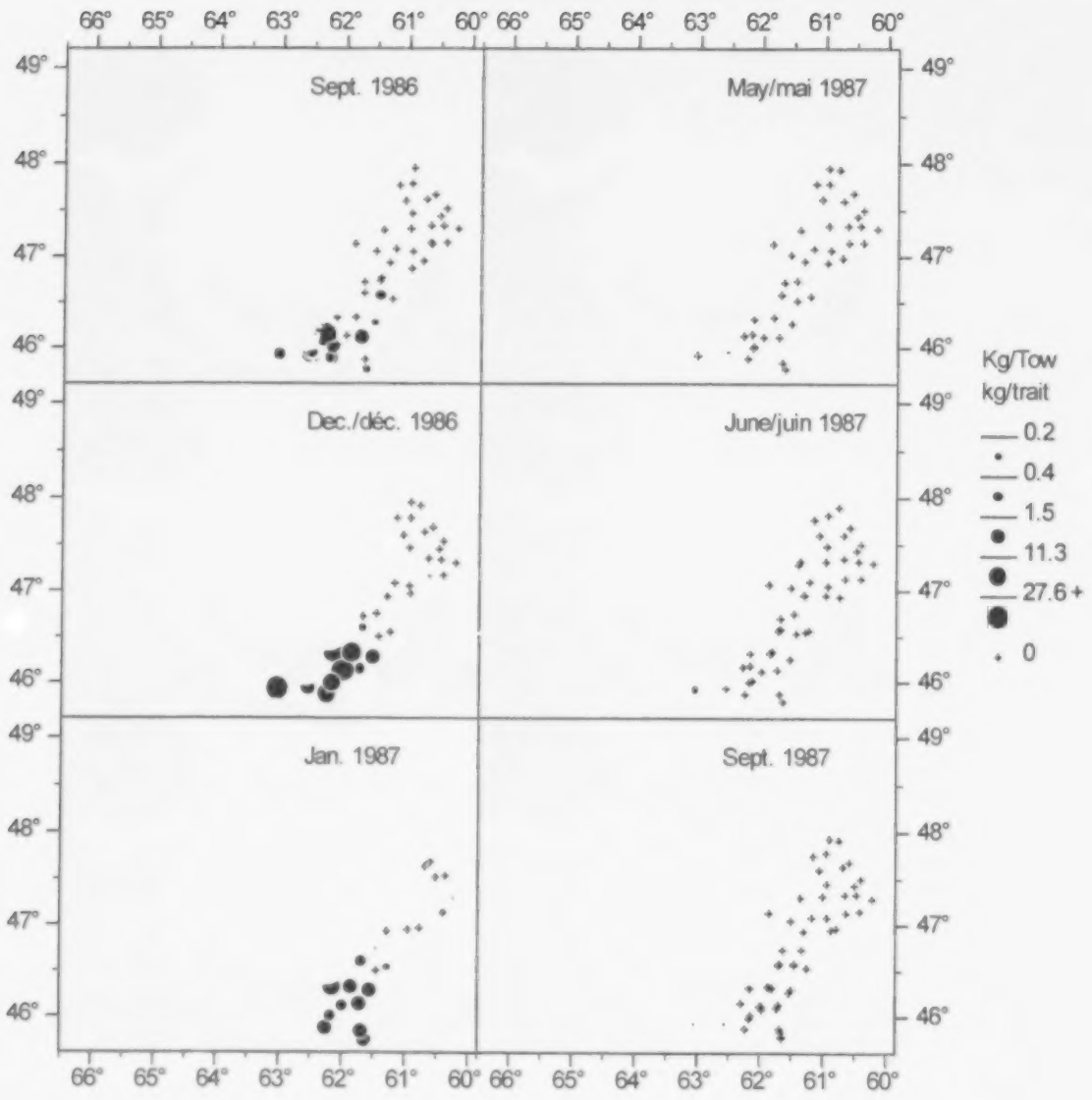

Figure 42a. S.E. Gulf of St. Lawrence seasonal distribution of catches (kg/tow) of Rainbow Smelt, *Osmerus mordax*

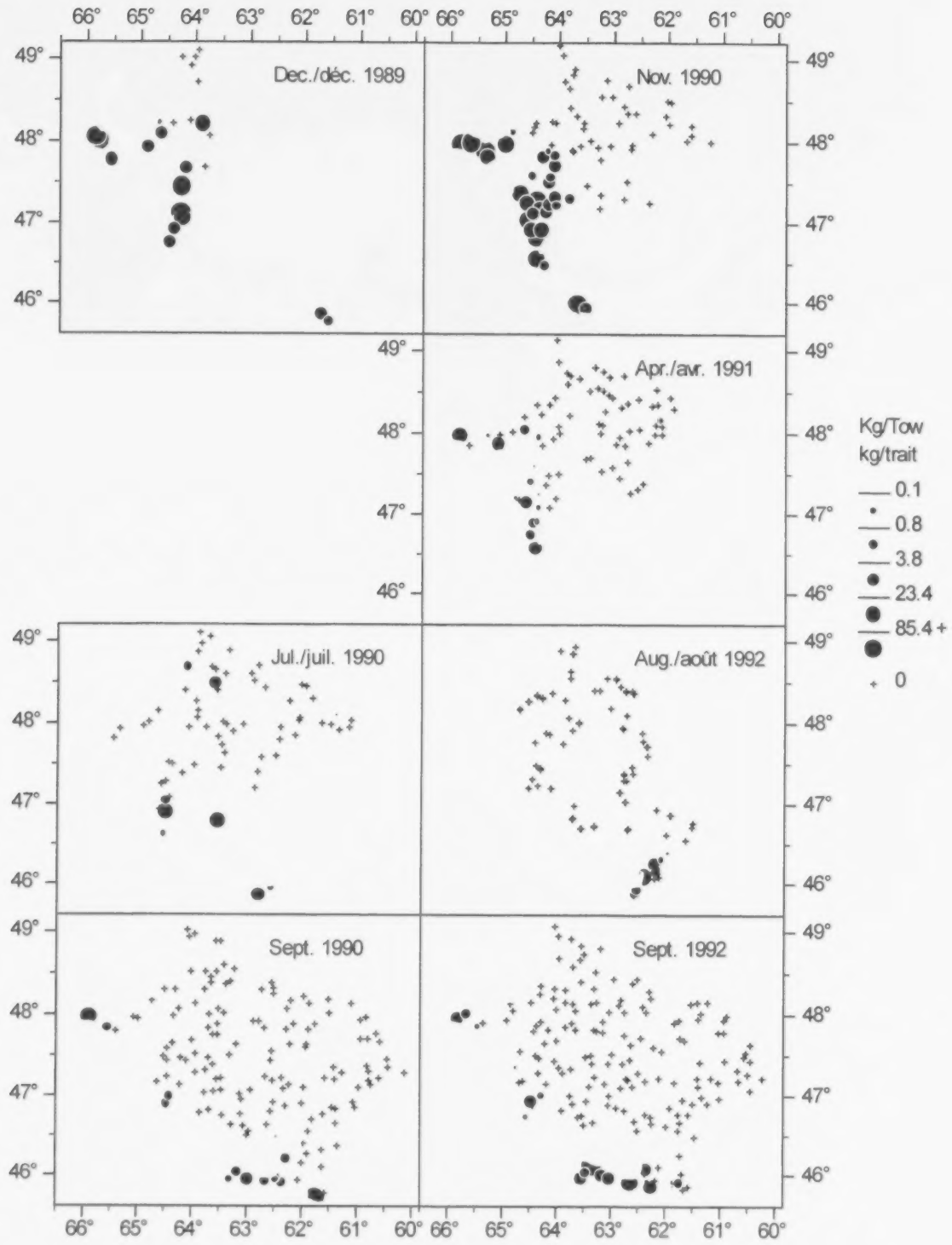

Figure 42b. S.W. Gulf of St. Lawrence seasonal distribution of catches (kg/tow) of Rainbow Smelt, *Osmerus mordax*

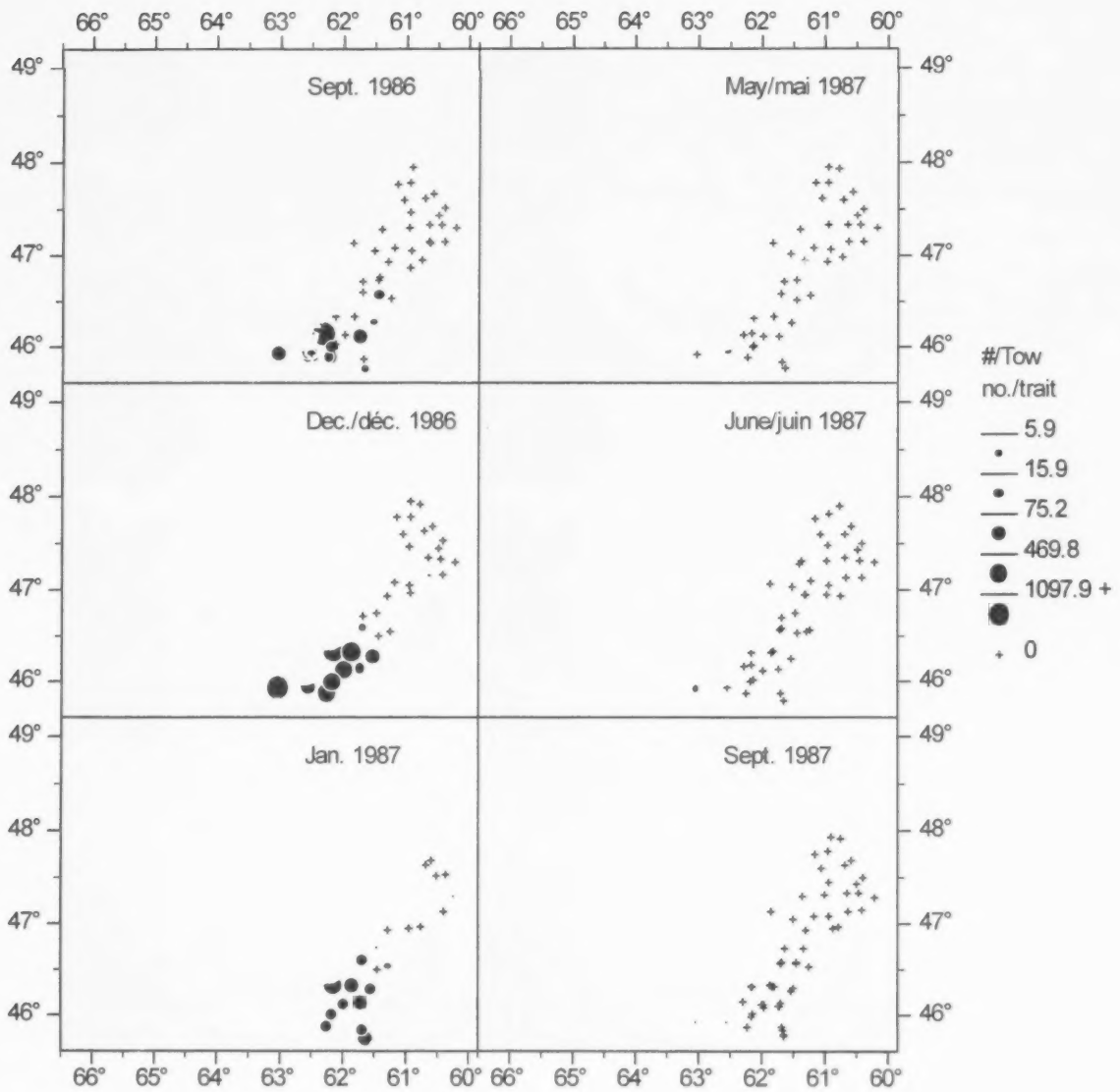

Figure 42c. S.E. Gulf of St. Lawrence seasonal distribution of catches (#/tow) of Rainbow Smelt, *Osmerus mordax*

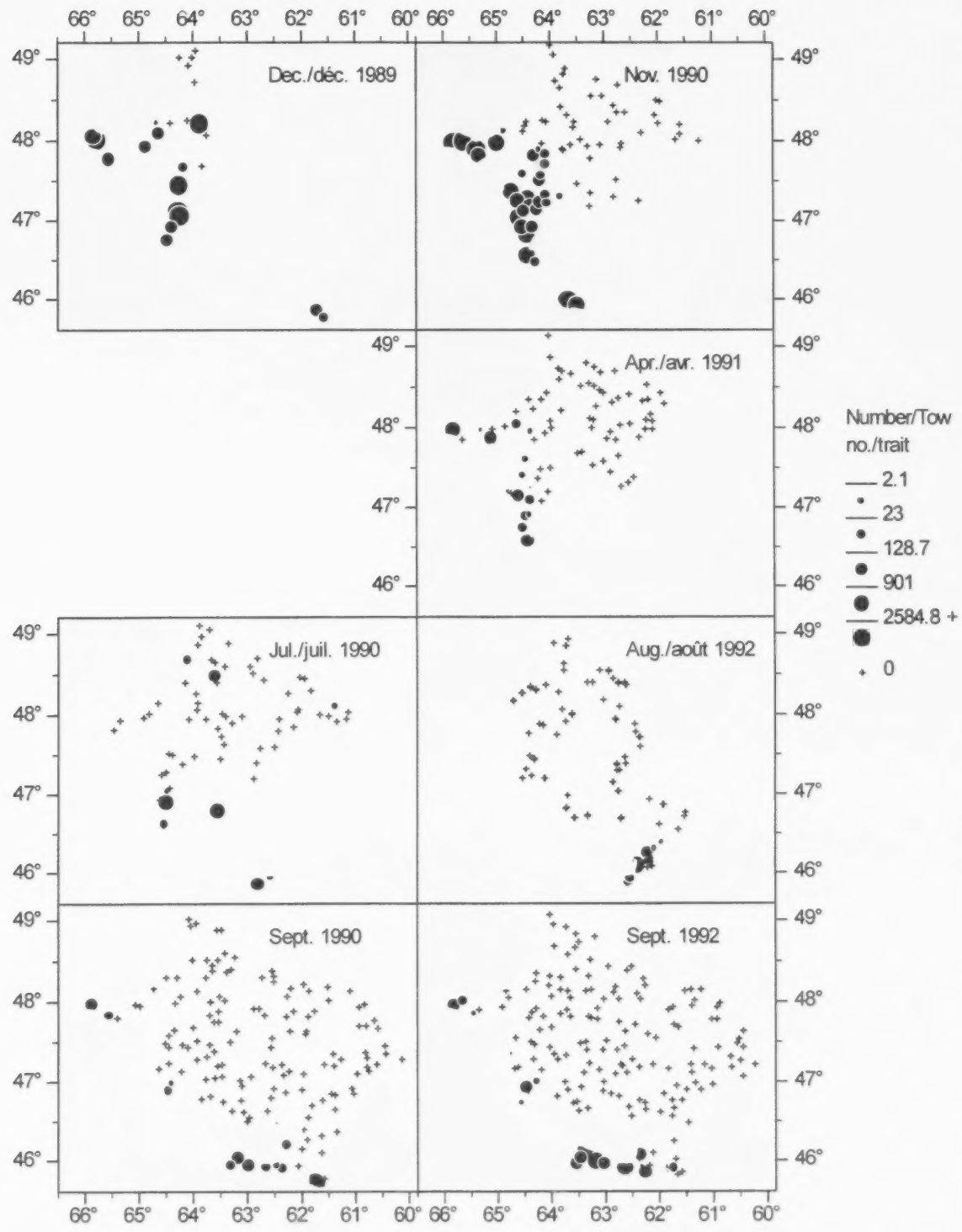

Figure 42d. S.W. Gulf of St. Lawrence seasonal distribution of catches (#/tow) of Rainbow Smelt, *Osmerus mordax*

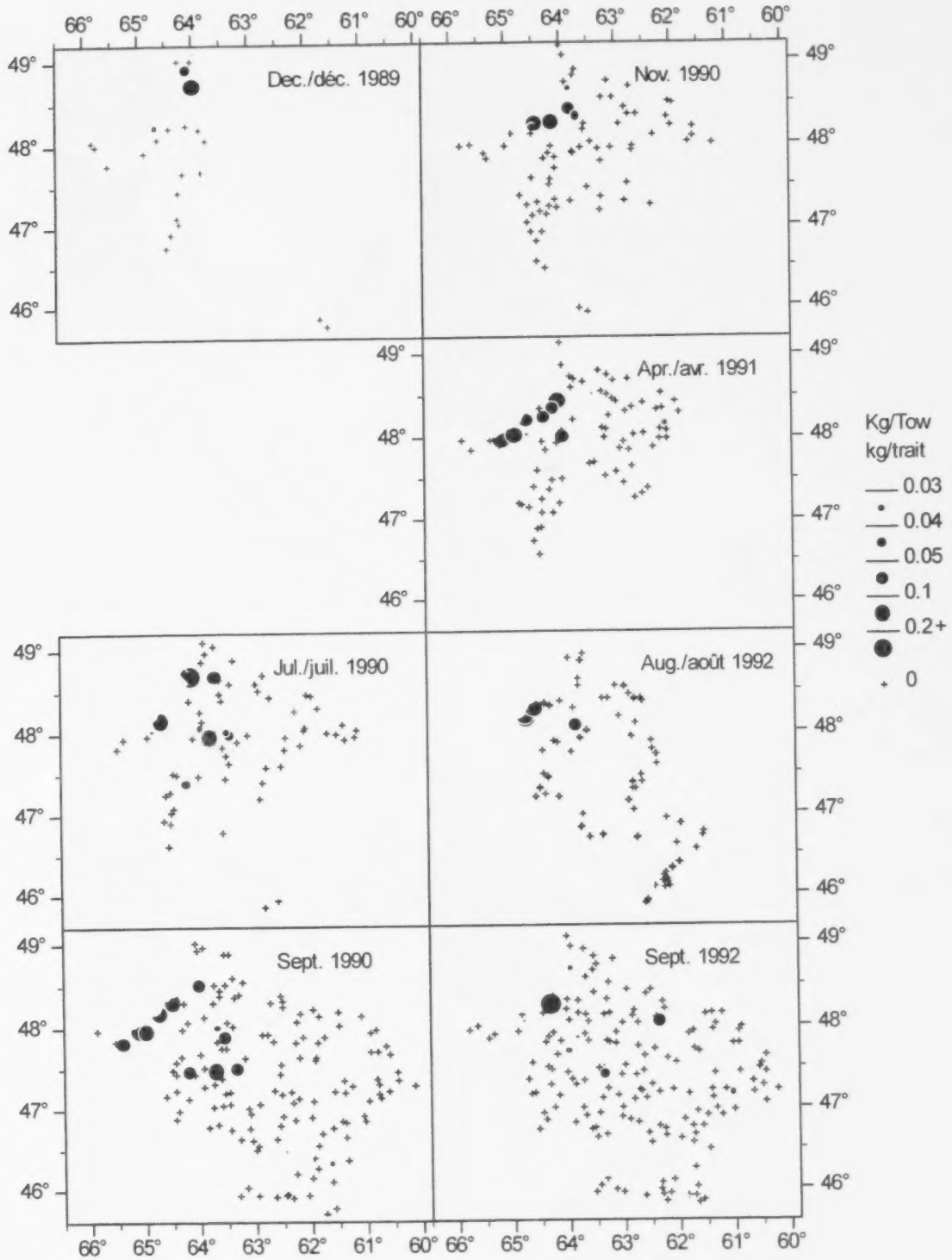

Figure 43a. S.W. Gulf of St. Lawrence seasonal distribution of catches (kg/tow) of Atlantic Sea Poacher, *Leptagonus decagonus*

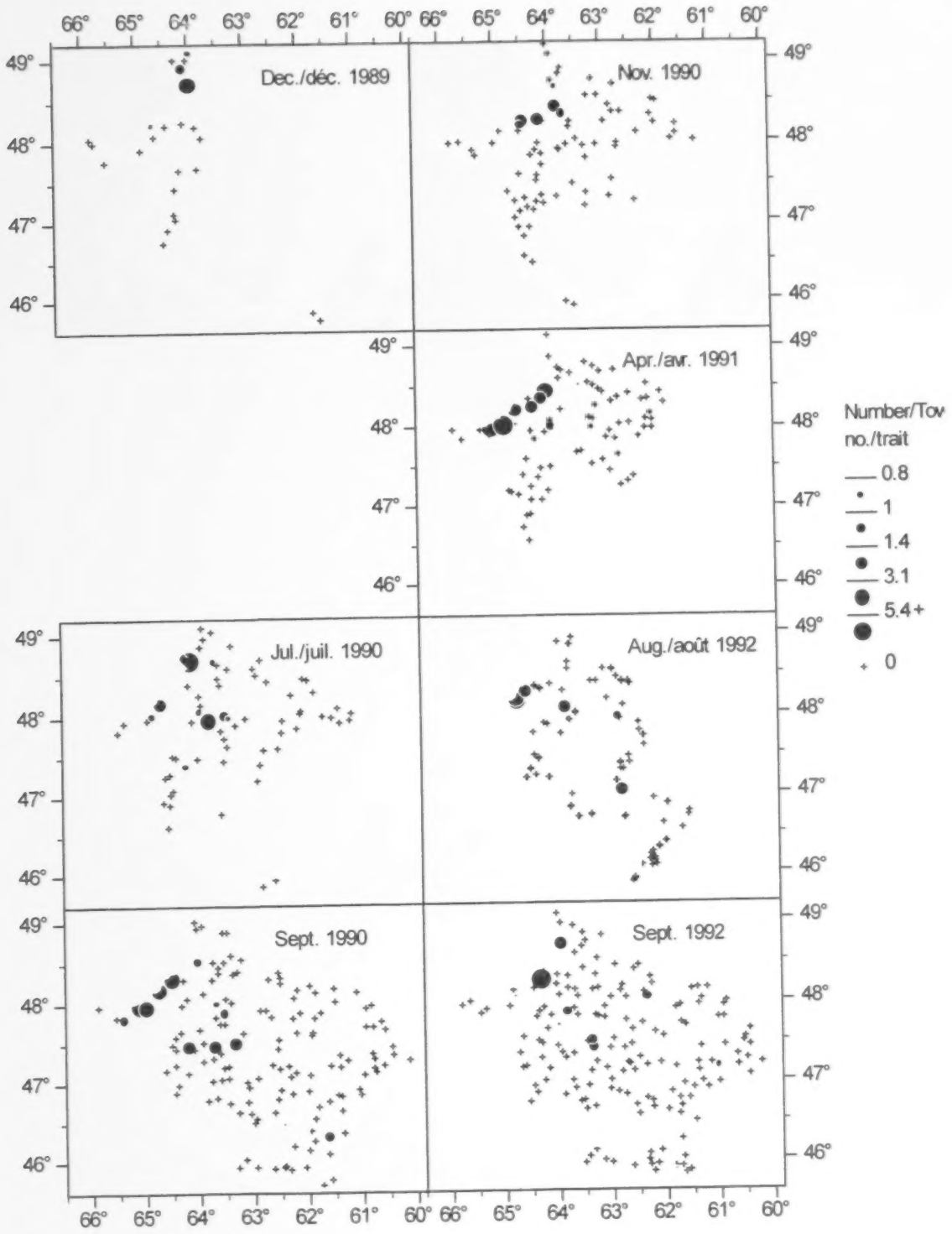

Figure 43b. S.W. Gulf of St. Lawrence seasonal distribution of catches (#/tow) of Atlantic Sea Poacher, *Leptagonus decagonus*

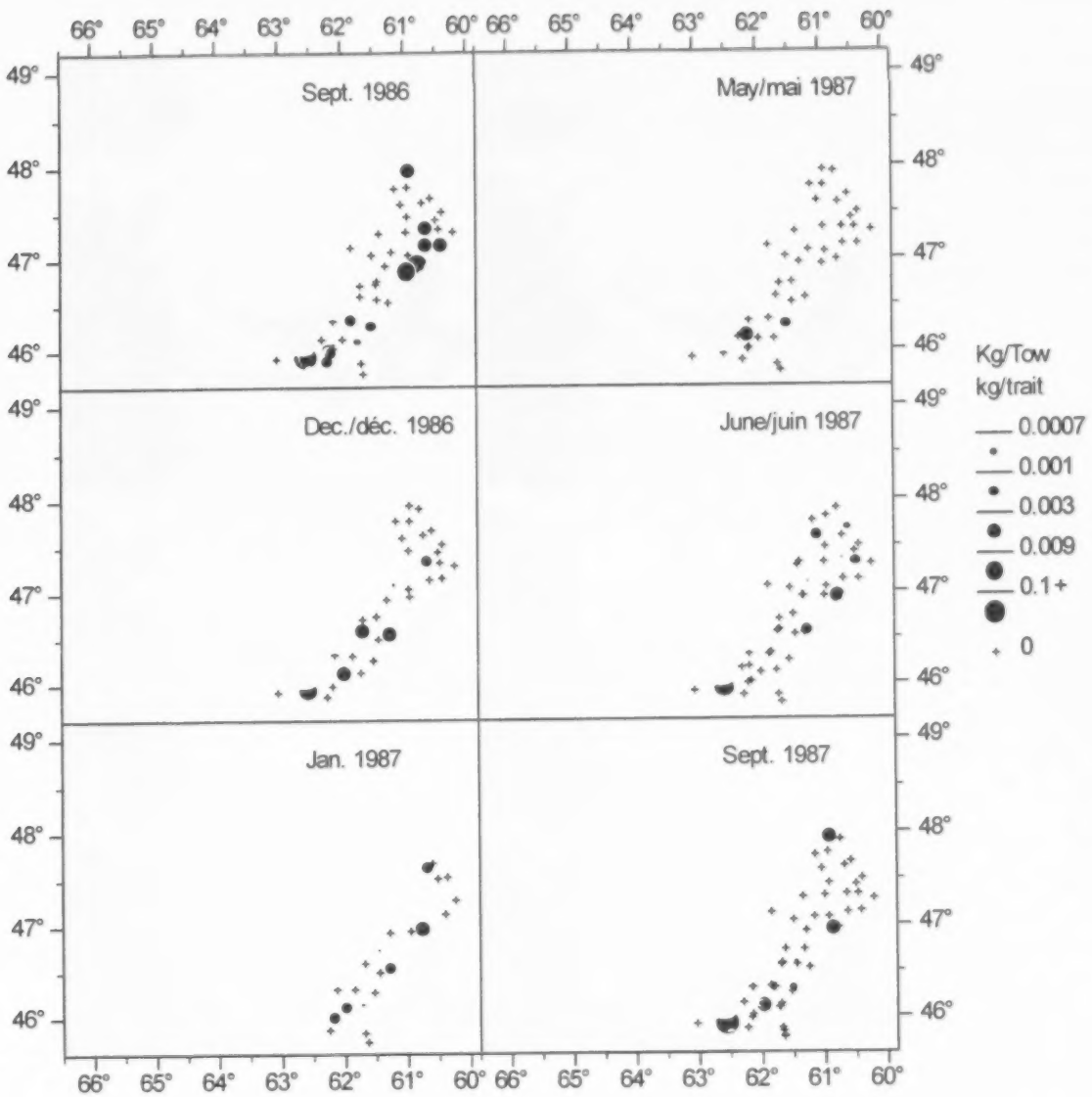

Figure 44a. S.E. Gulf of St. Lawrence seasonal distribution of catches (kg/tow) of Alligatorfish, *Aspidophoroides monopterygius*

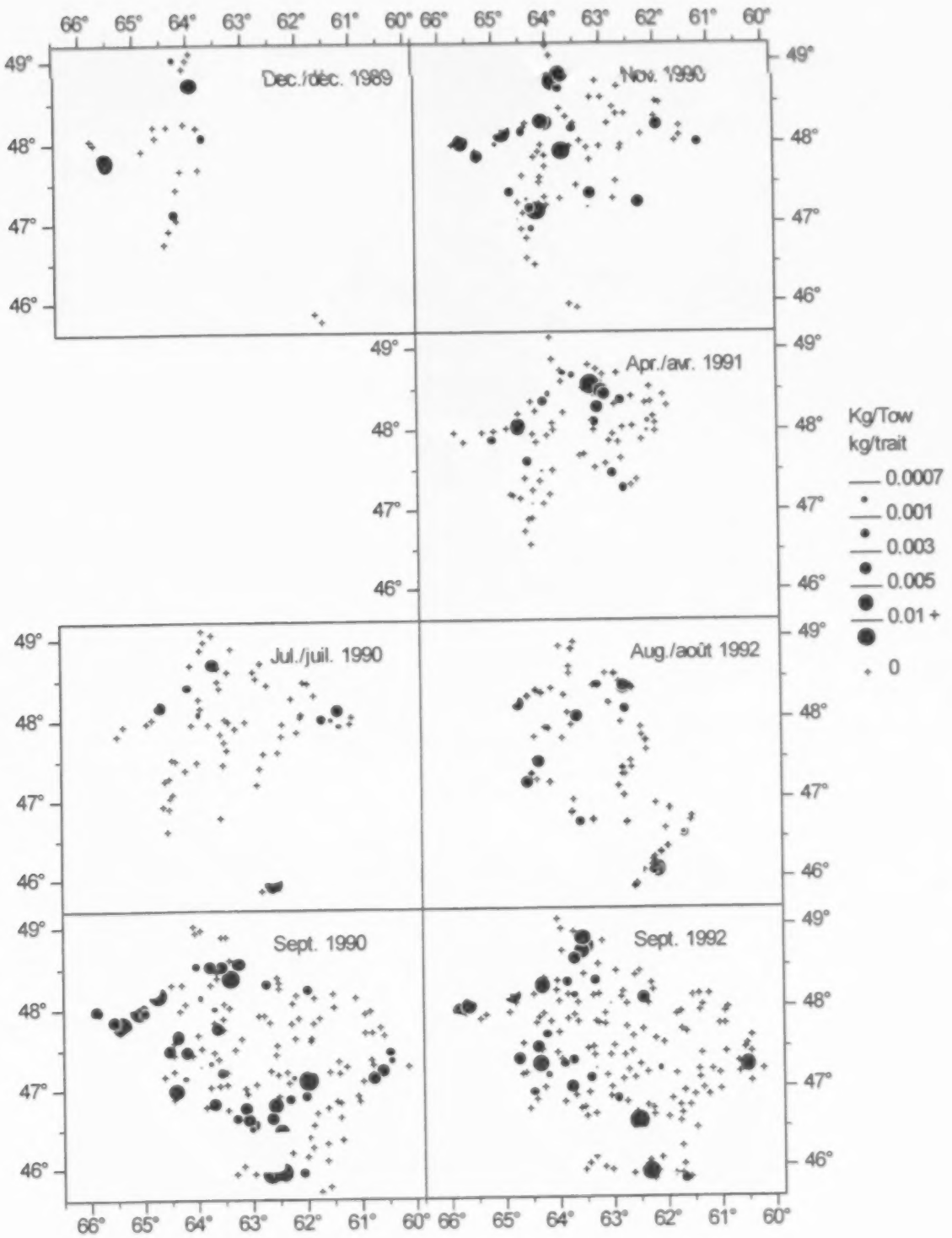

Figure 44b. S.W. Gulf of St. Lawrence seasonal distribution of catches (kg/tow) of Alligatorfish, *Aspidophoroides monopterygius*

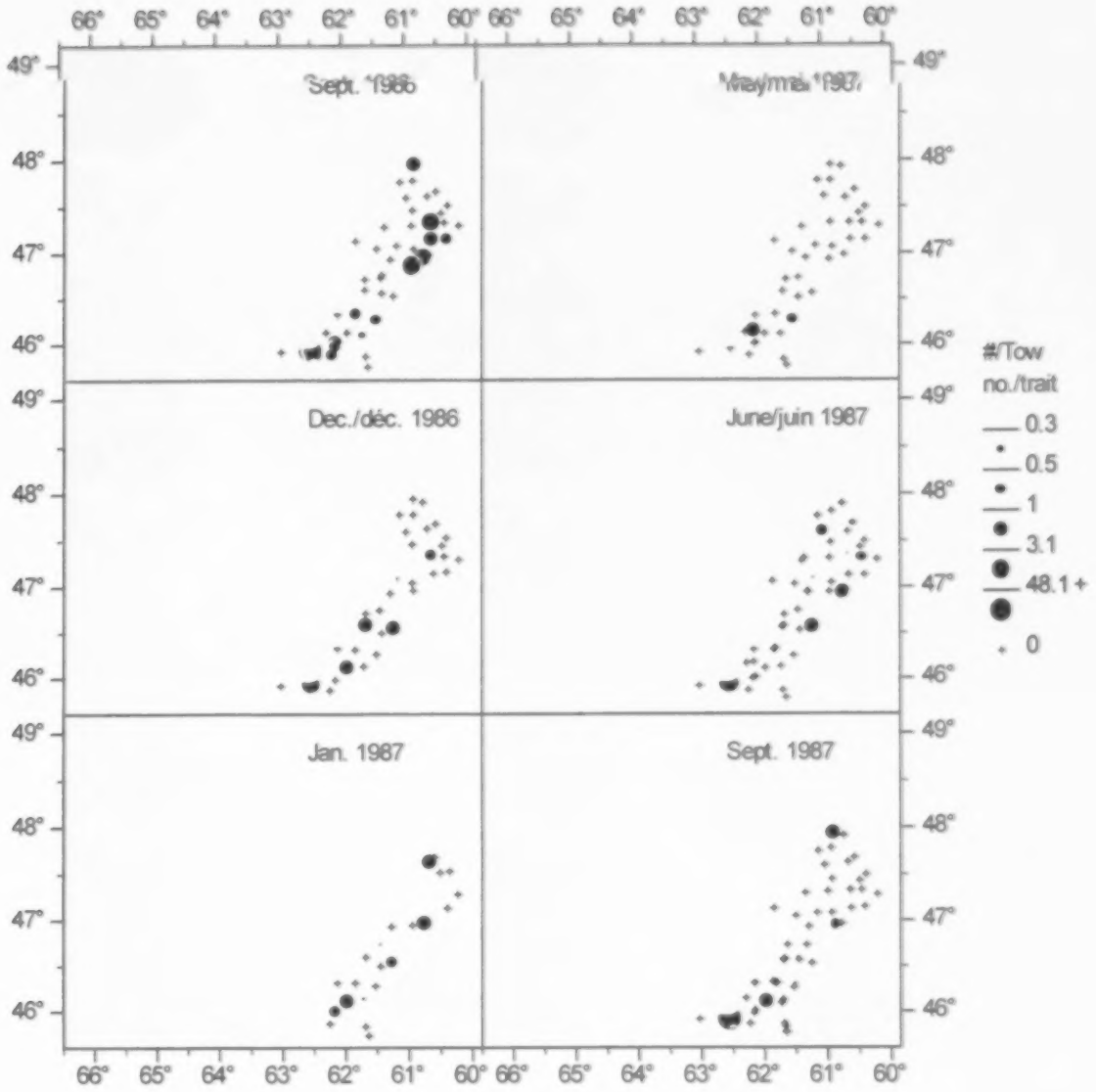

Figure 44c. S.E. Gulf of St. Lawrence seasonal distribution of catches (#/tow) of Alligatorfish, *Aspidophoroides monopterygius*

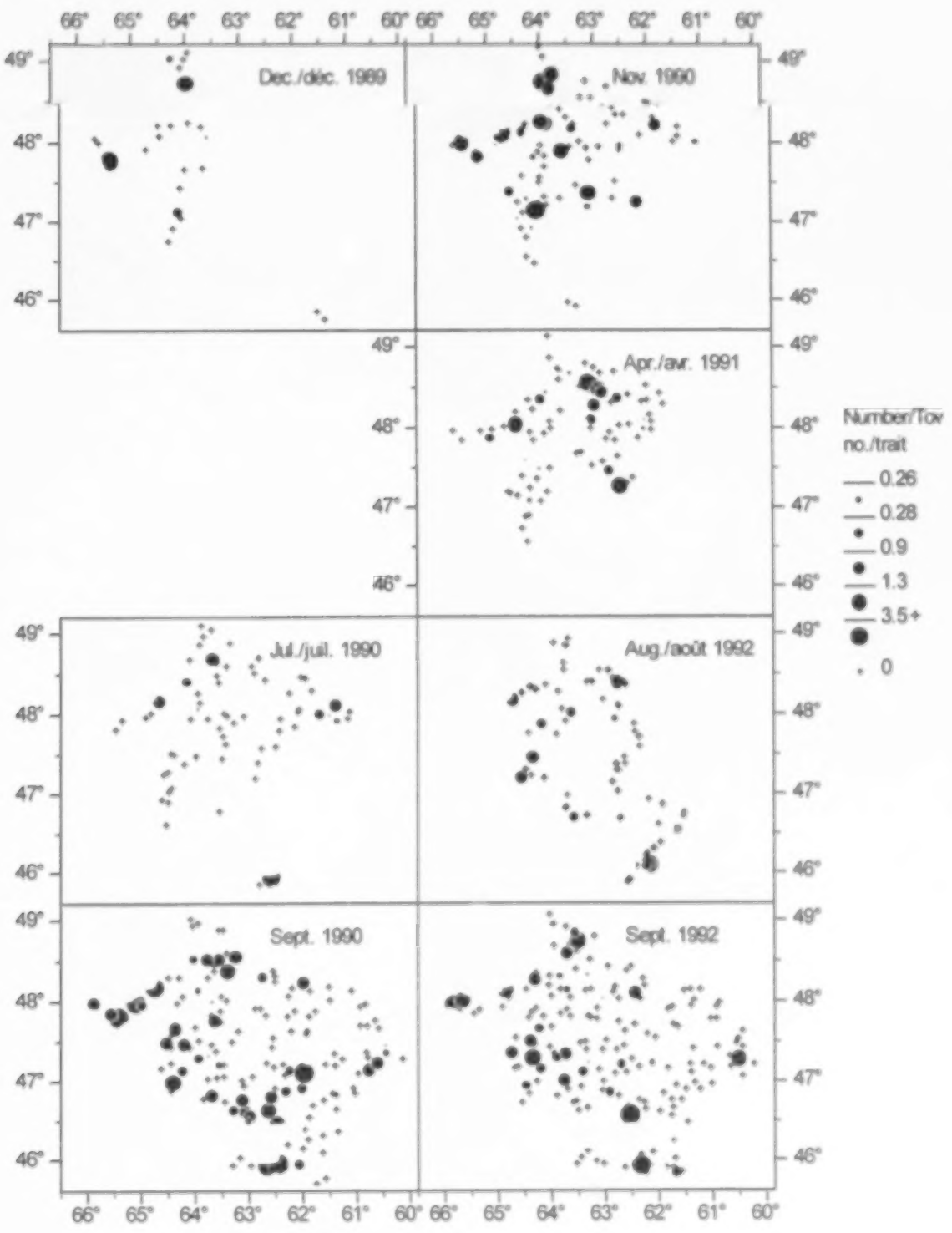

Figure 44d. S.W. Gulf of St. Lawrence seasonal distribution of catches (#/tow) of Alligatorfish, *Aspidophoroides monopterygius*

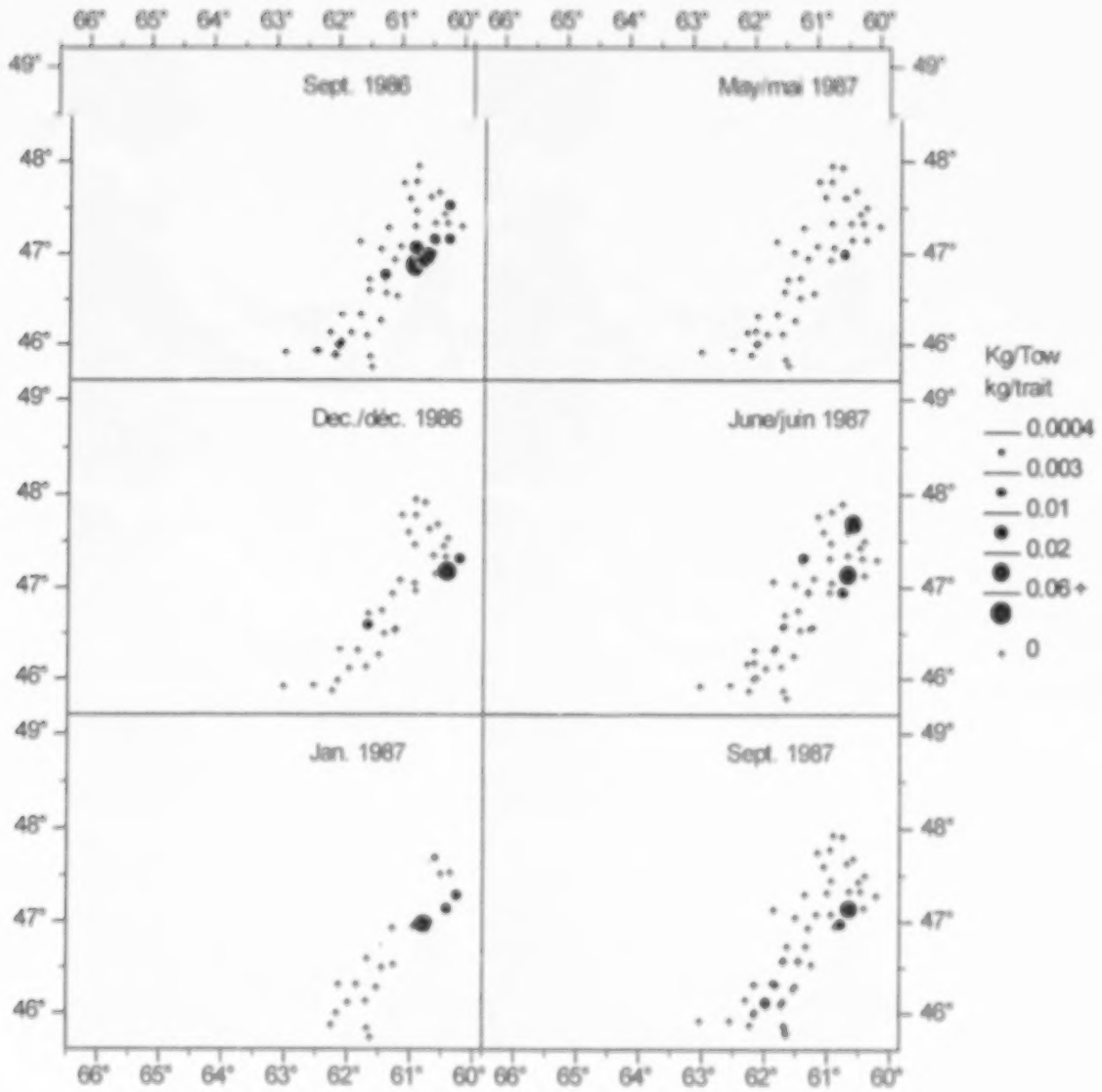

Figure 45a. S.E. Gulf of St. Lawrence seasonal distribution of catches (kg/tow) of Arctic Hookear Sculpin, *Artedielius uncinatus*

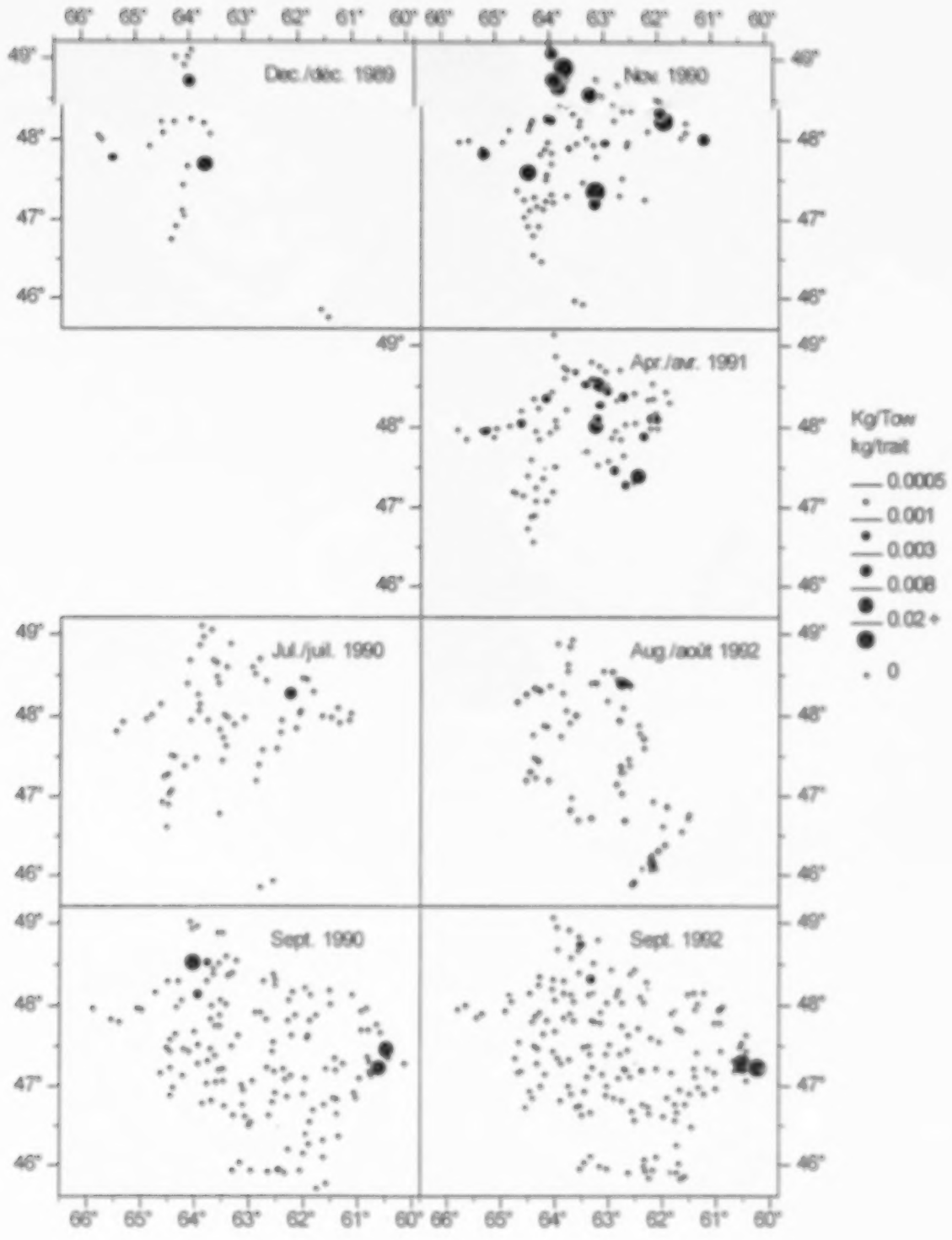

Figure 45b. S.W. Gulf of St. Lawrence seasonal distribution of catches (kg/tow) of Arctic Hookear Sculpin, *Artedidius uncinatus*

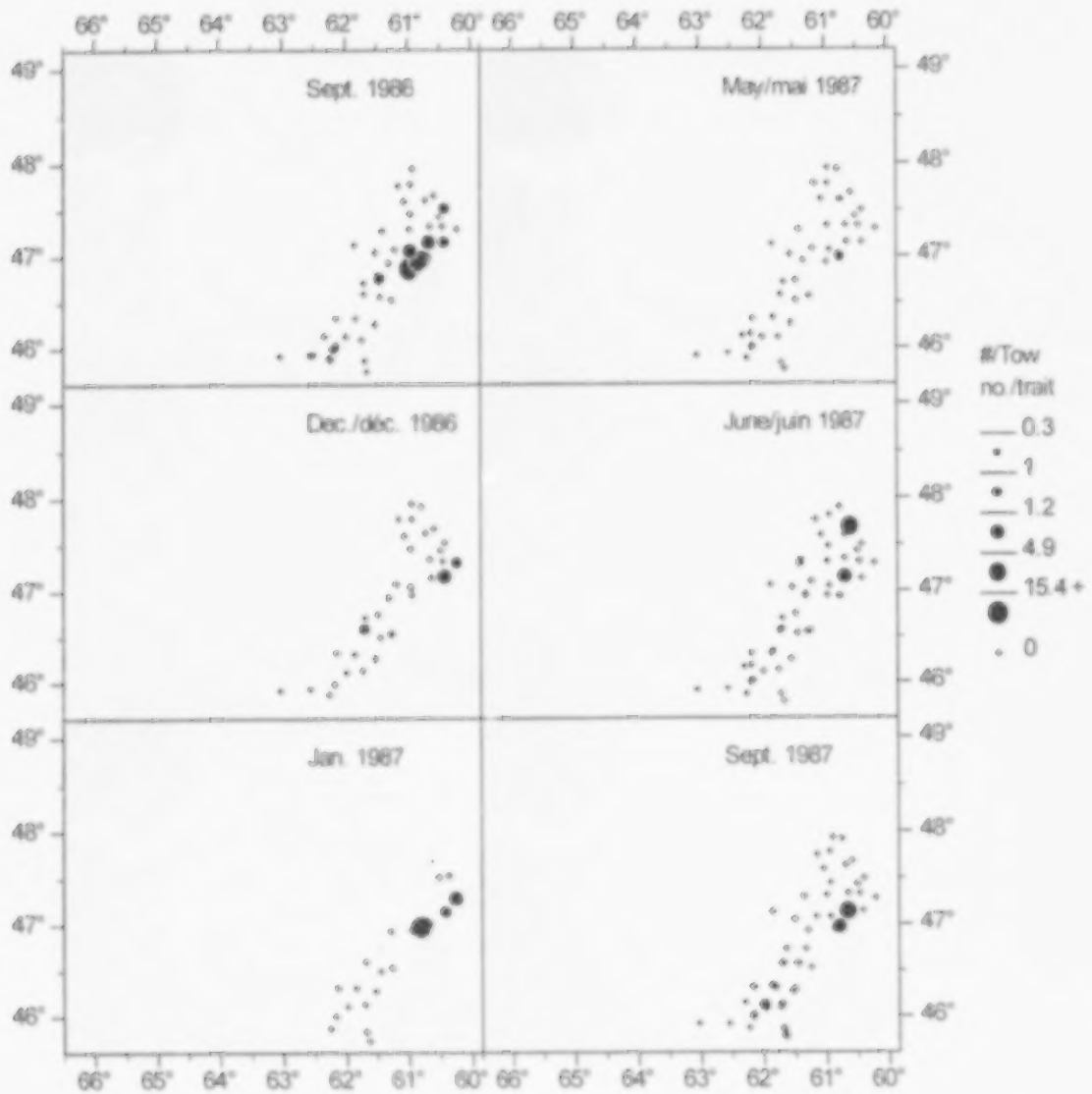

Figure 45c. S.E. Gulf of St. Lawrence seasonal distribution of catches (#/tow) of Arctic Hookear Sculpin, *Artediellus uncinatus*

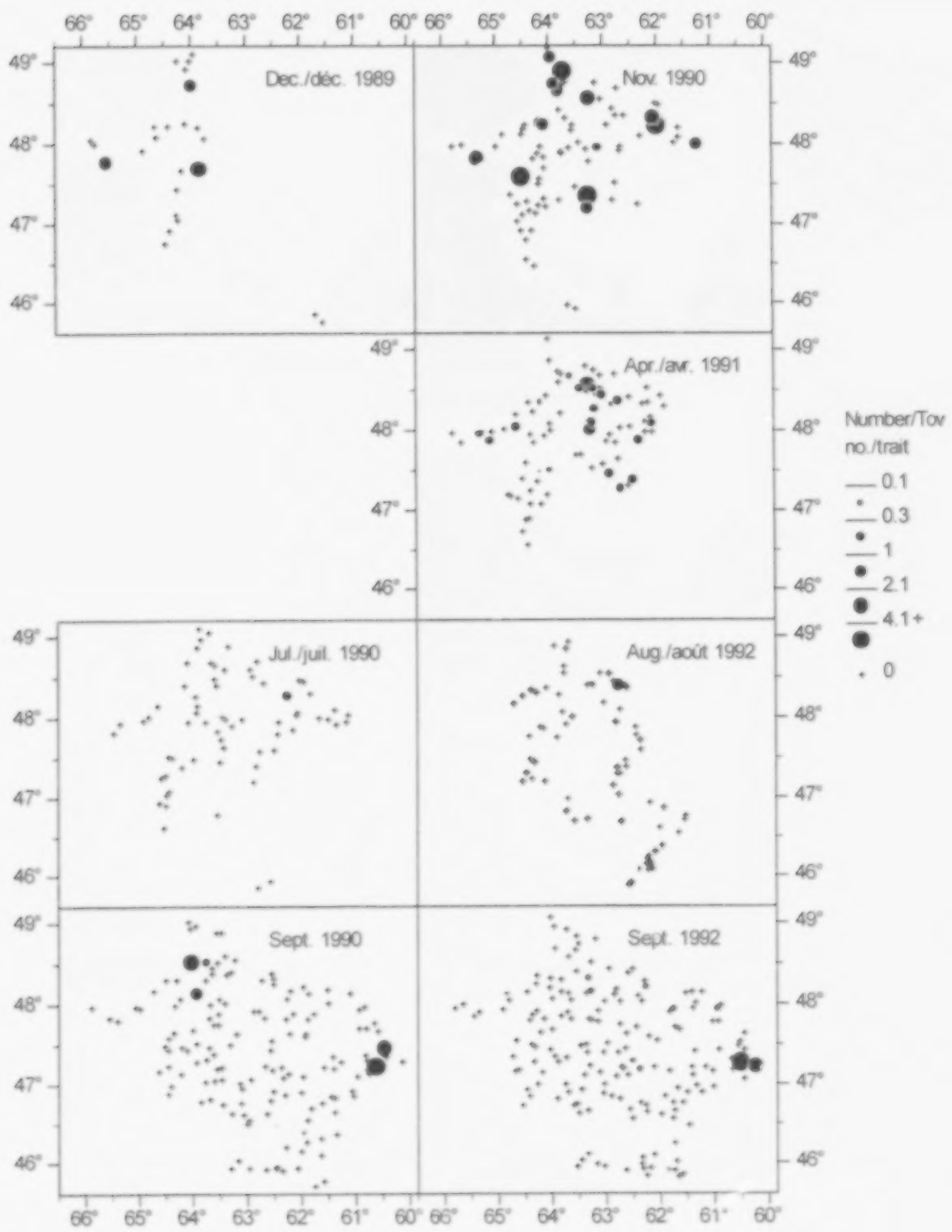

Figure 45d. S.W. Gulf of St. Lawrence seasonal distribution of catches (#/tow) of Arctic Hookear Sculpin, *Artediellus uncinatus*

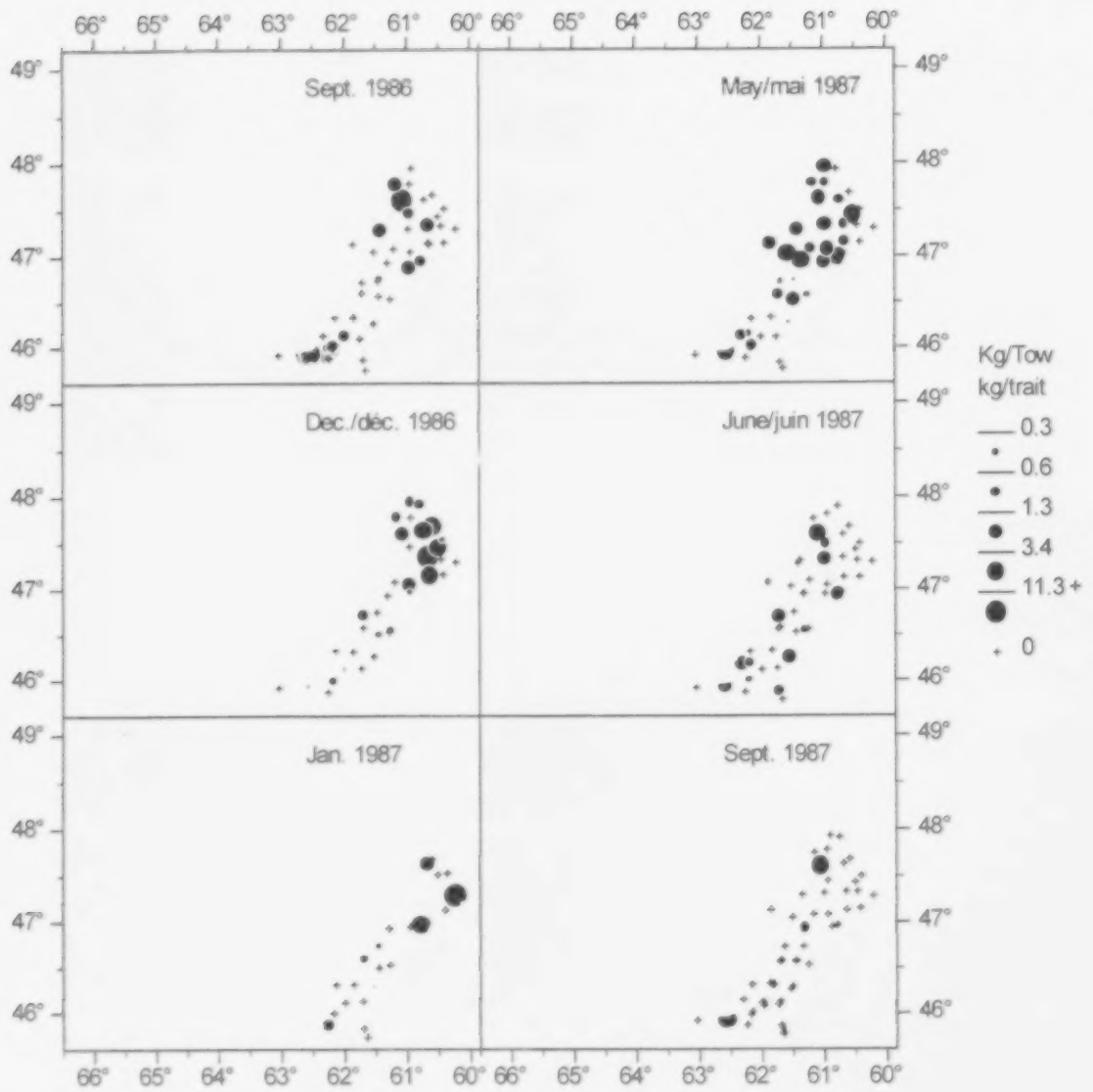

Figure 46a. S.E. Gulf of St. Lawrence seasonal distribution of catches (kg/tow) of Sea Raven, *Hemitripterus americanus*

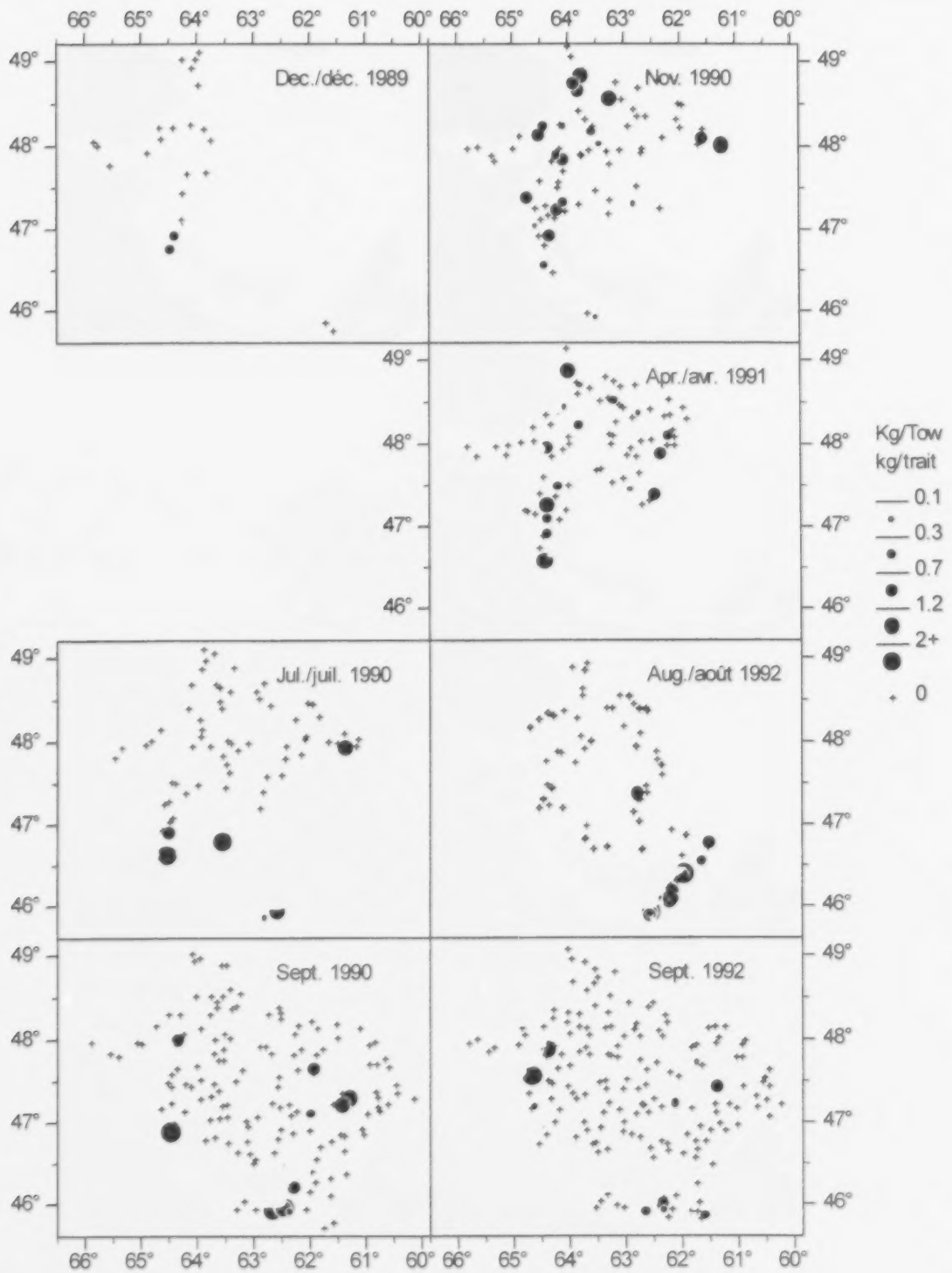

Figure 46b. S.W. Gulf of St. Lawrence seasonal distribution of catches (kg/tow) of Sea Raven, *Hemitripterus americanus*

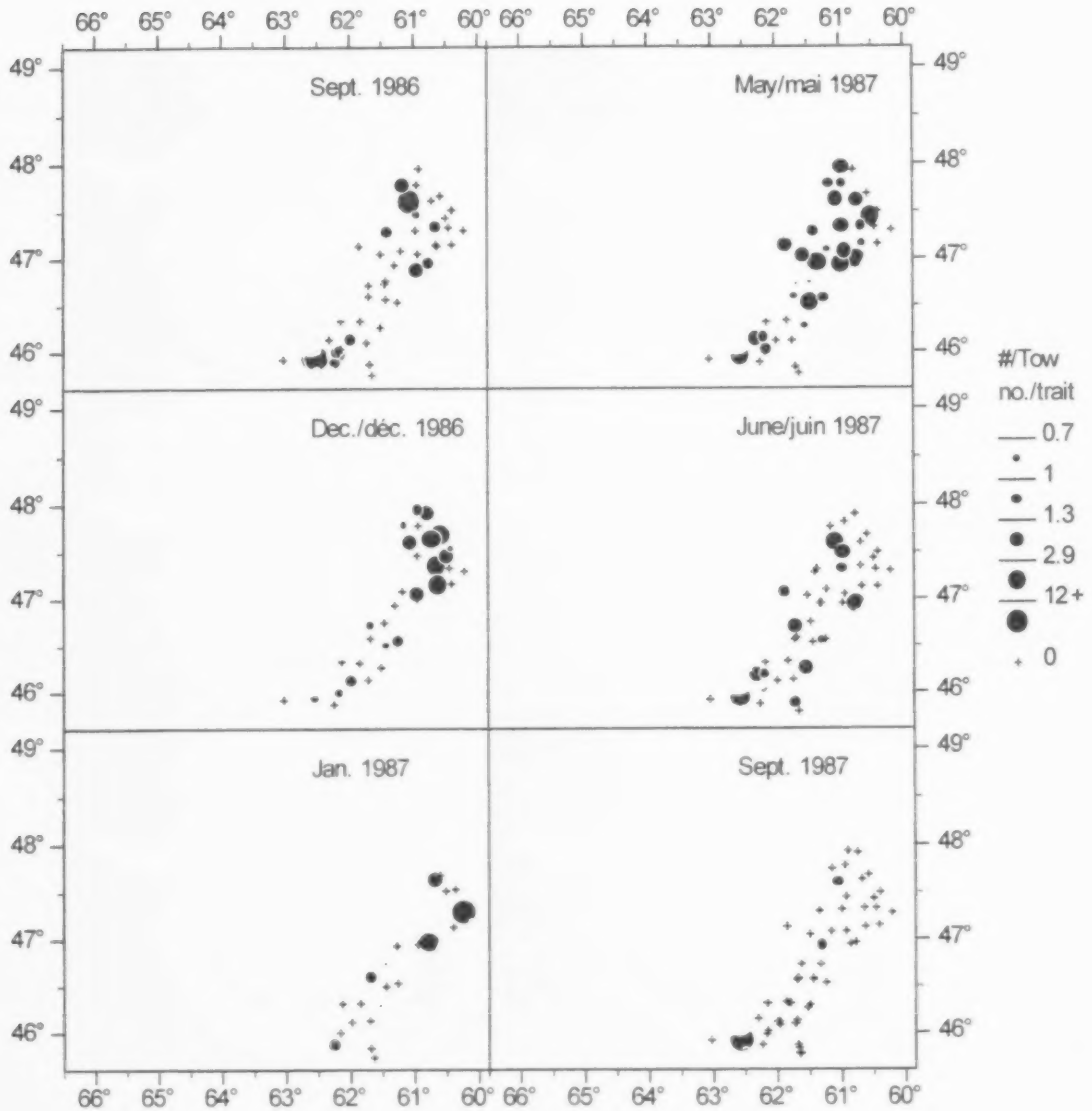

Figure 46c. S.E. Gulf of St. Lawrence seasonal distribution of catches (#/tow) of Sea Raven, *Hemitripterus americanus*

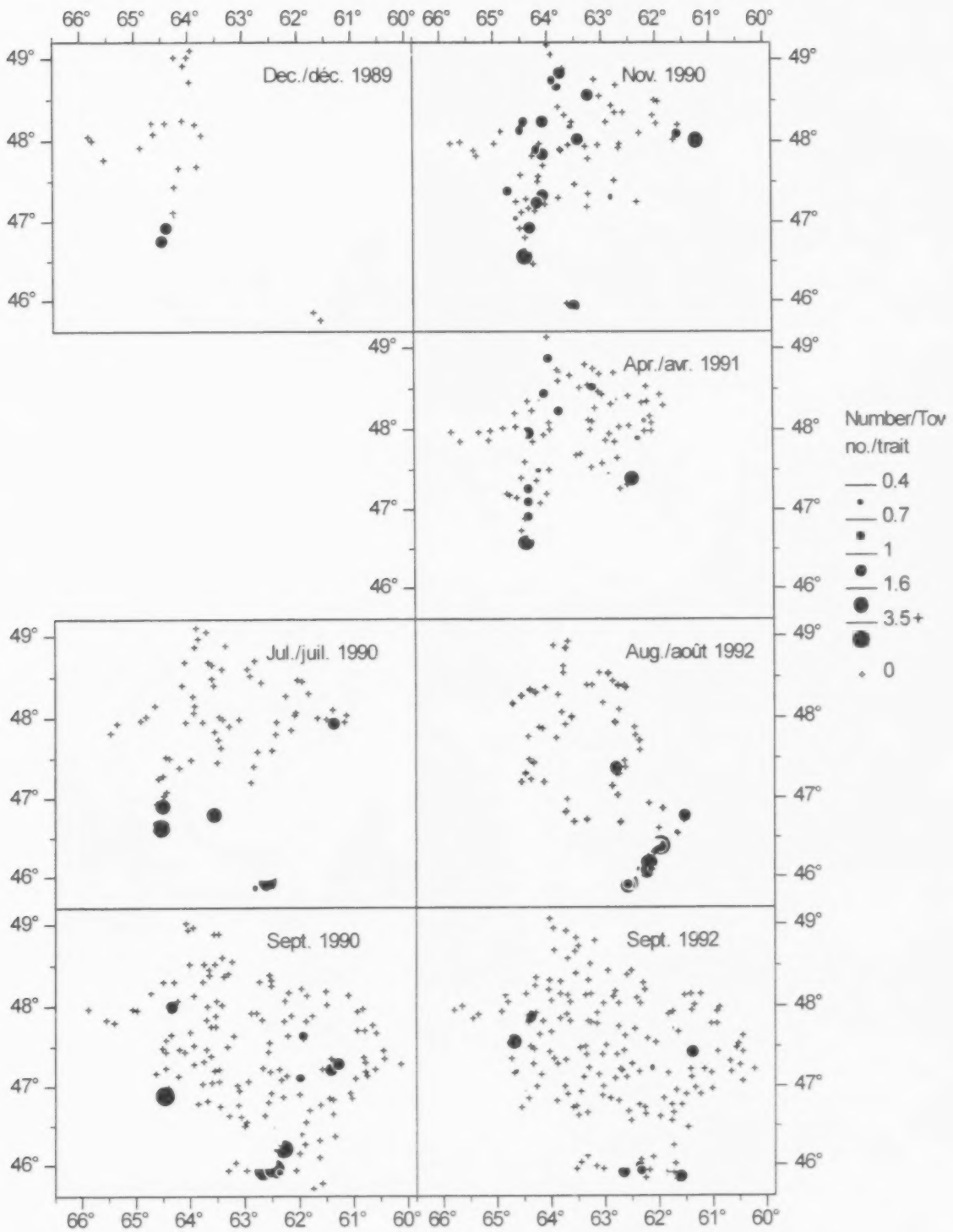

Figure 46d. S.W. Gulf of St. Lawrence seasonal distribution of catches (#/tow) of Sea Raven, *Hemitripterus americanus*

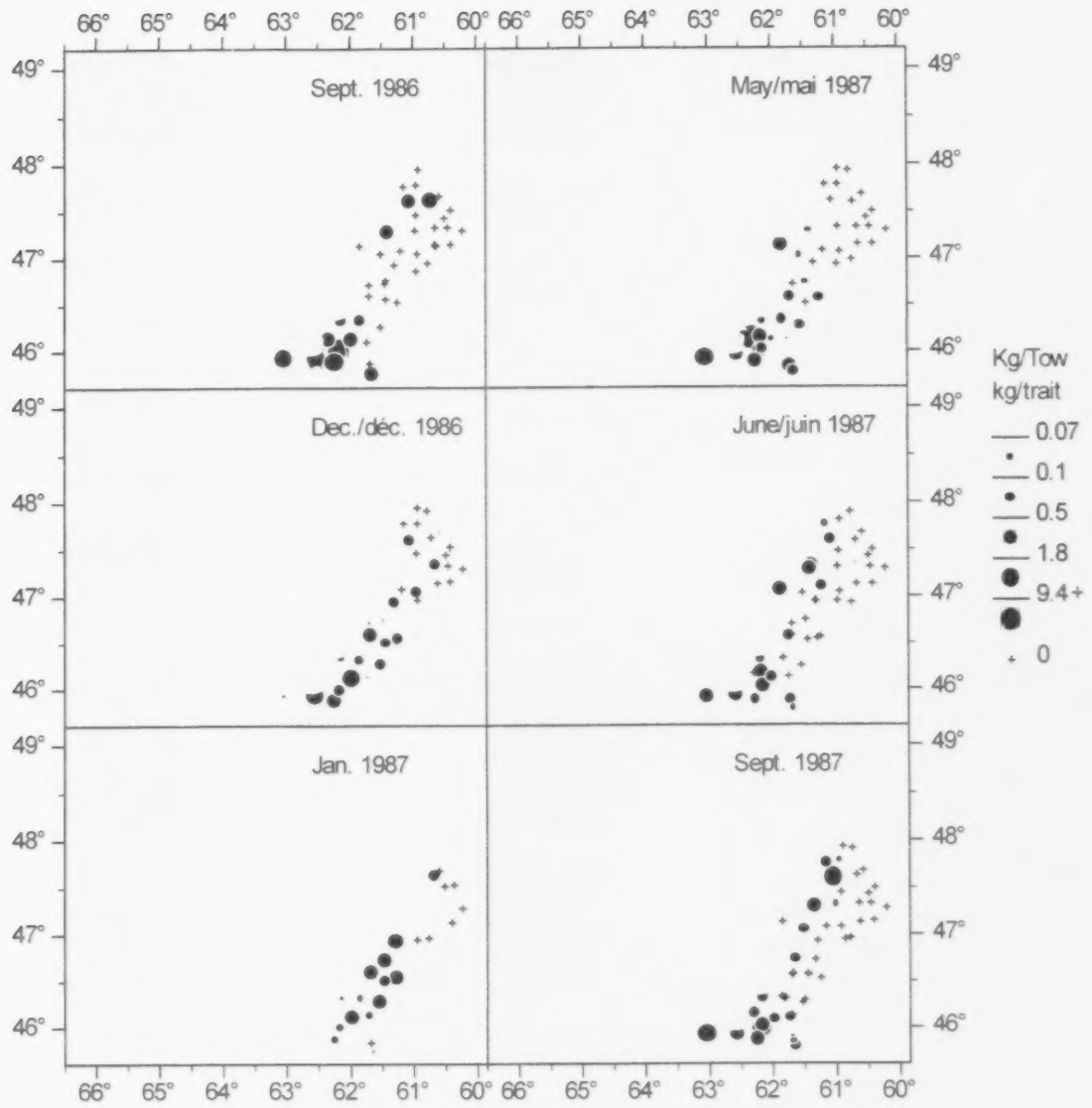

Figure 47a. S.E. Gulf of St. Lawrence seasonal distribution of catches (kg/tow) of Longhorn Sculpin, *Myoxocephalus octodecemspinosus*

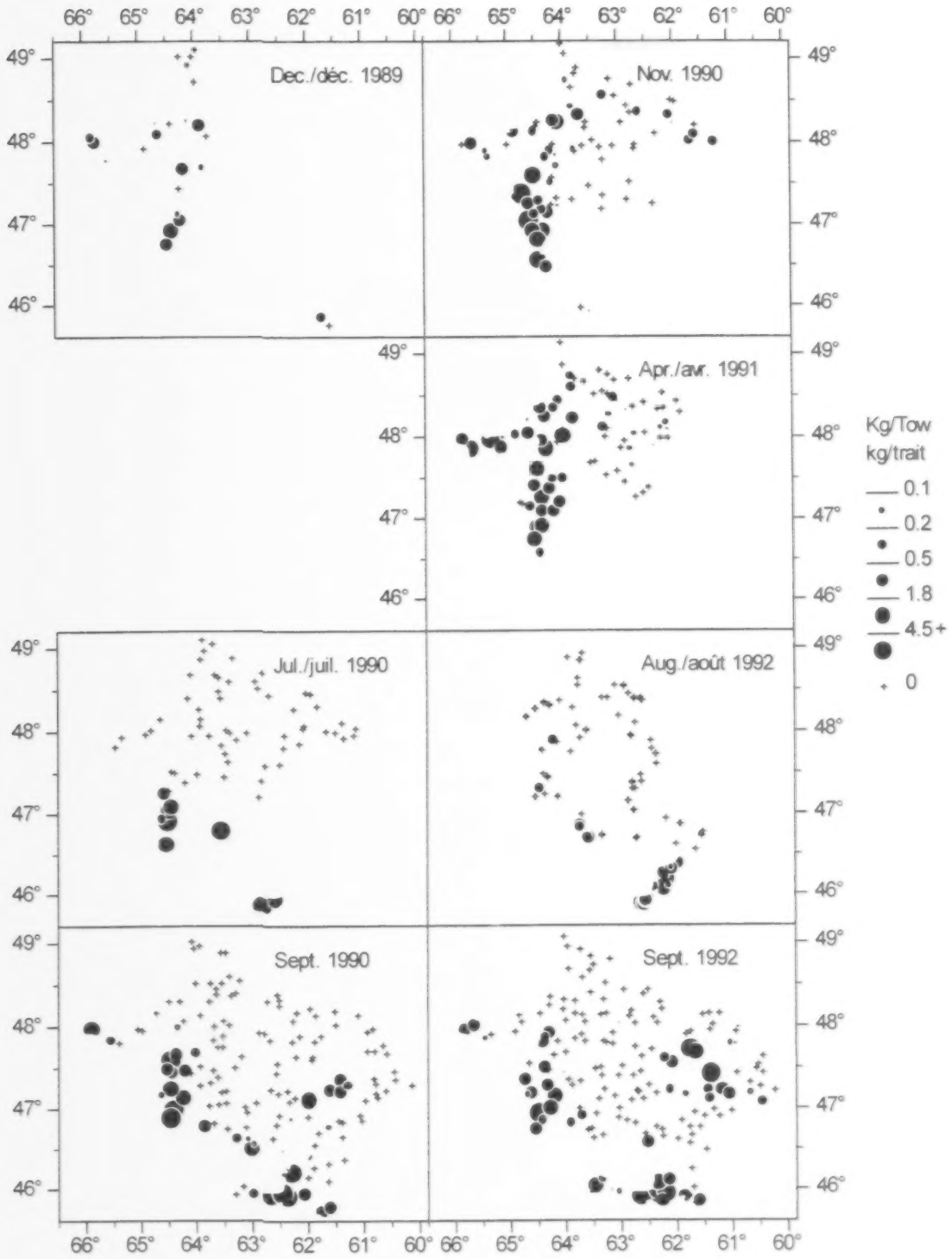

Figure 47b. S.W. Gulf of St. Lawrence seasonal distribution of catches (kg/tow) of Longhorn Sculpin, *Myoxocephalus octodecemspinosus*

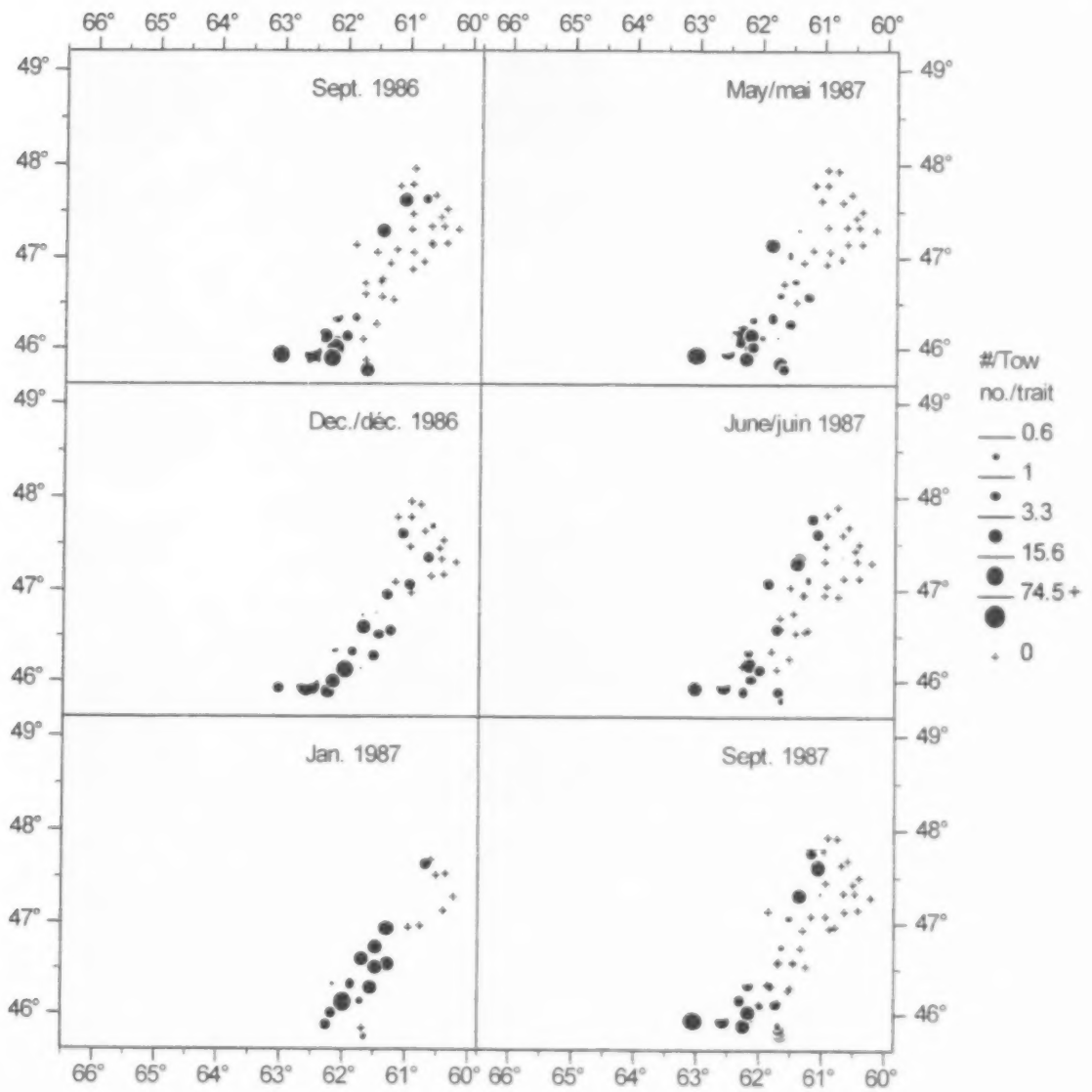

Figure 47c. S.E. Gulf of St. Lawrence seasonal distribution of catches (#/tow) of Longhorn Sculpin, *Myoxocephalus octodecemspinosus*

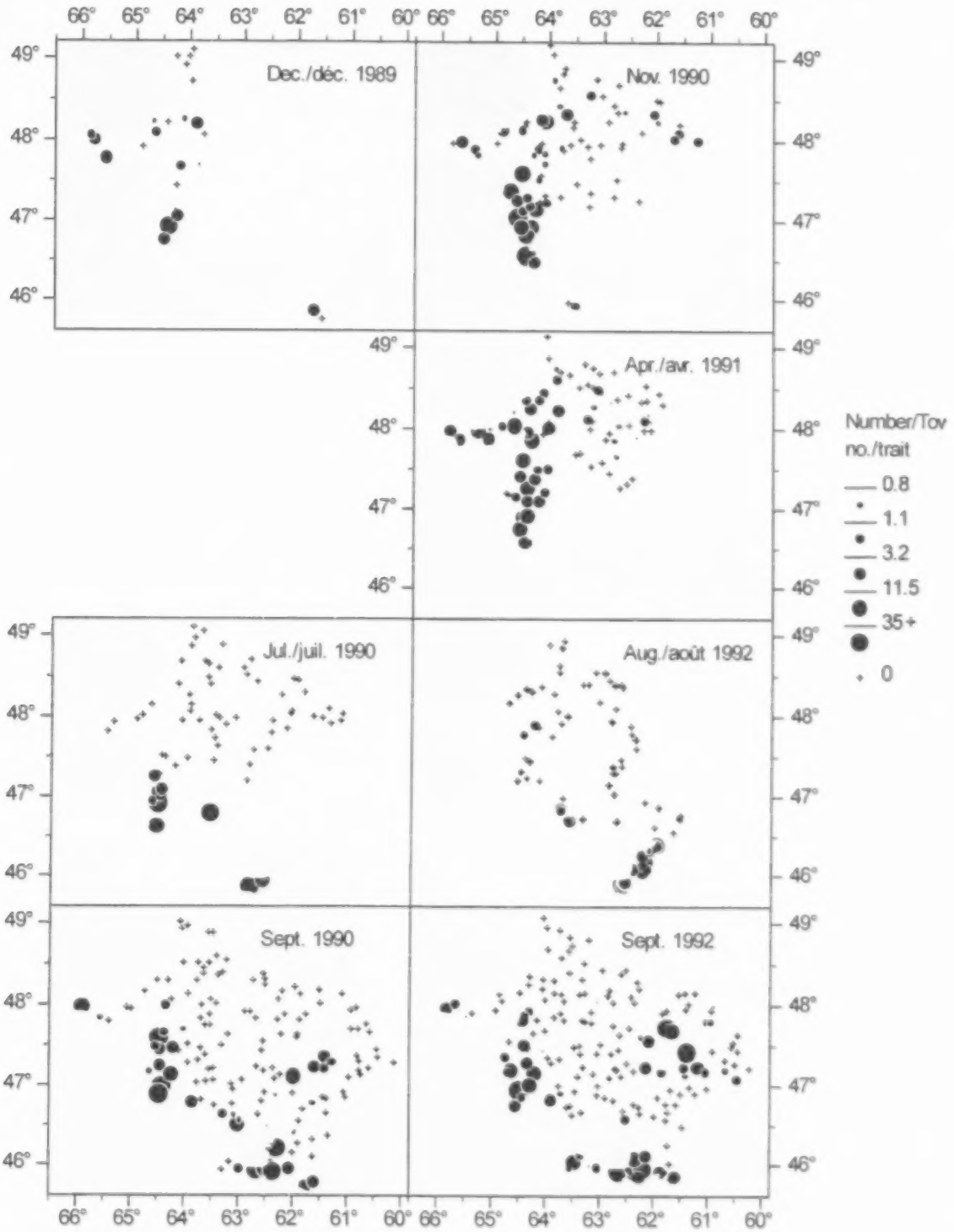

Figure 47d. S.W. Gulf of St. Lawrence seasonal distribution of catches (#/tow) of Longhorn Sculpin, *Myoxocephalus octodecemspinosus*

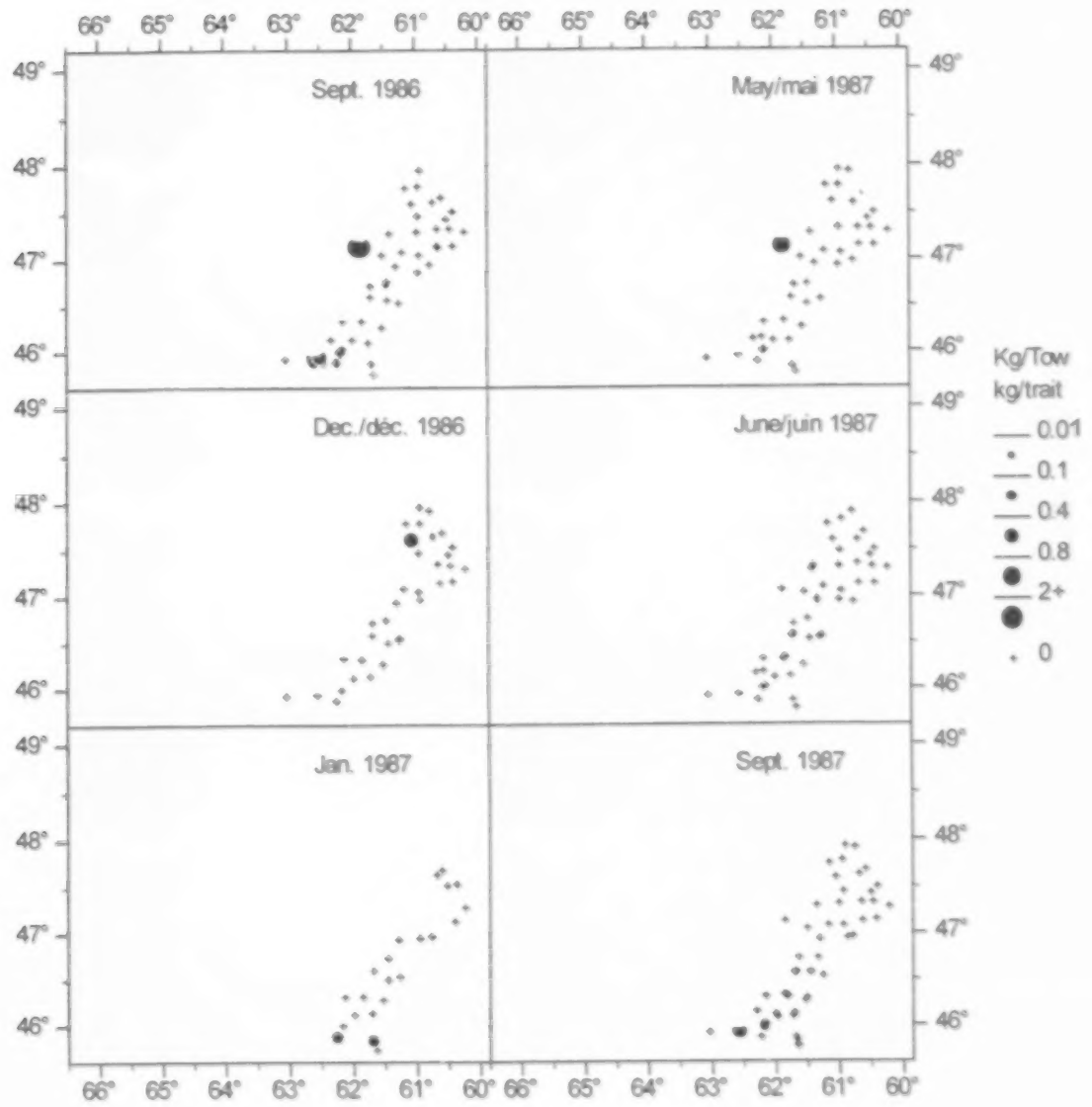

Figure 48a. S.E. Gulf of St. Lawrence seasonal distribution of catches (kg/tow) of Shorthorn Sculpin, *Myoxocephalus scorpius*

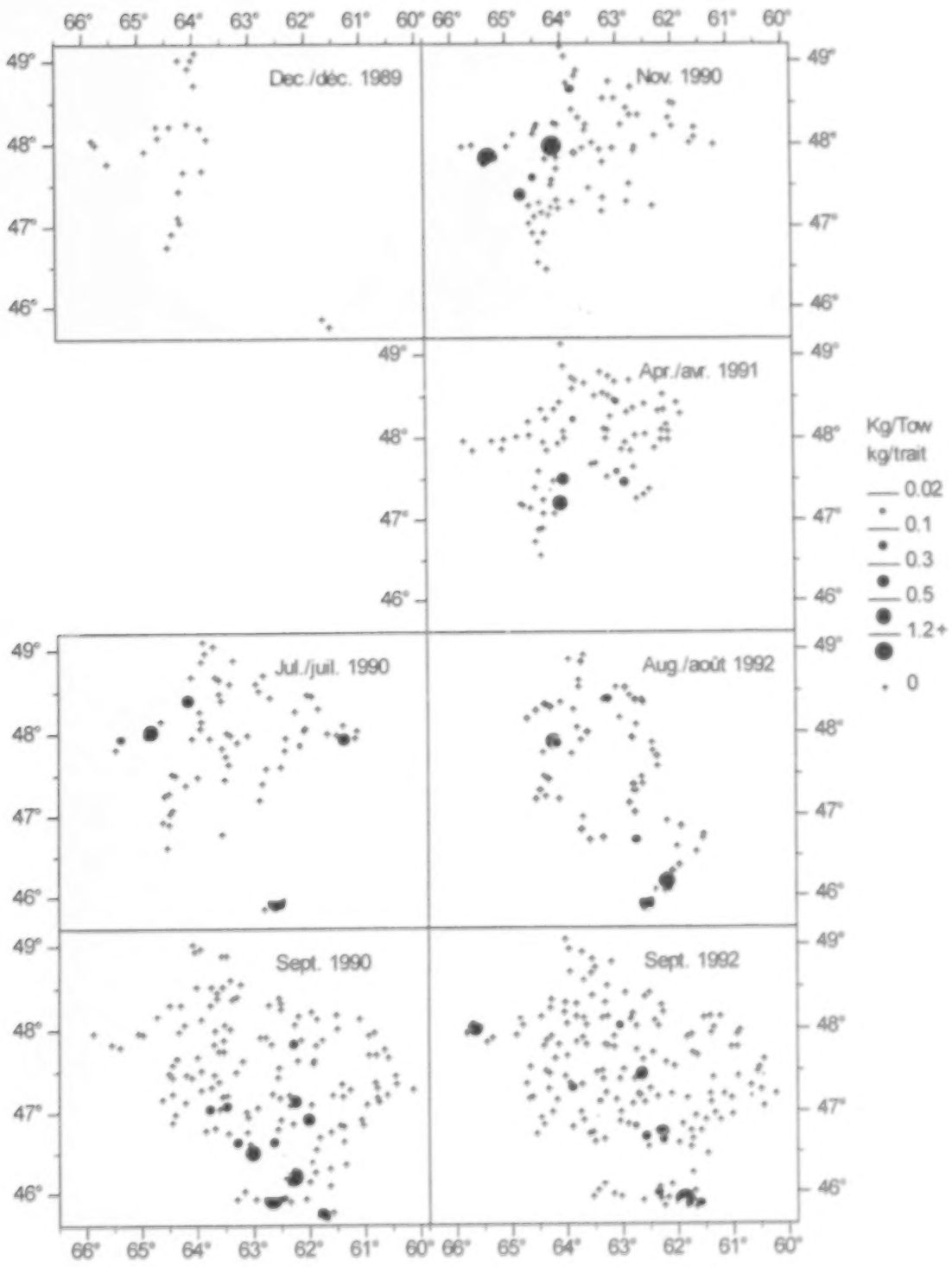

Figure 48b. S.W. Gulf of St. Lawrence seasonal distribution of catches (kg/tow) of Shorthorn Sculpin, *Myoxocephalus scorpius*

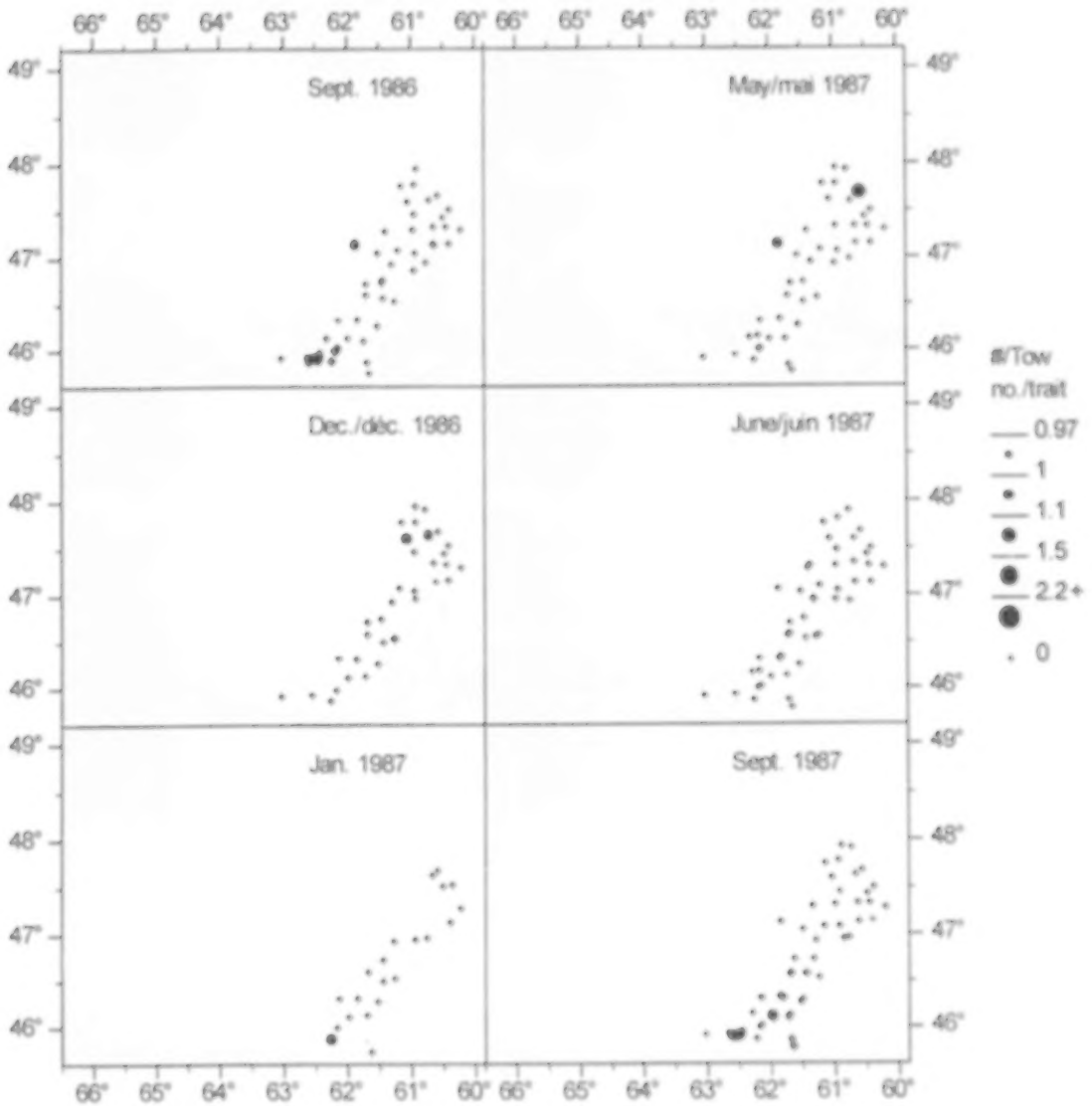

Figure 48c. S.E. Gulf of St. Lawrence seasonal distribution of catches (#/tow) of Shorthorn Sculpin, *Myoxocephalus scorpius*

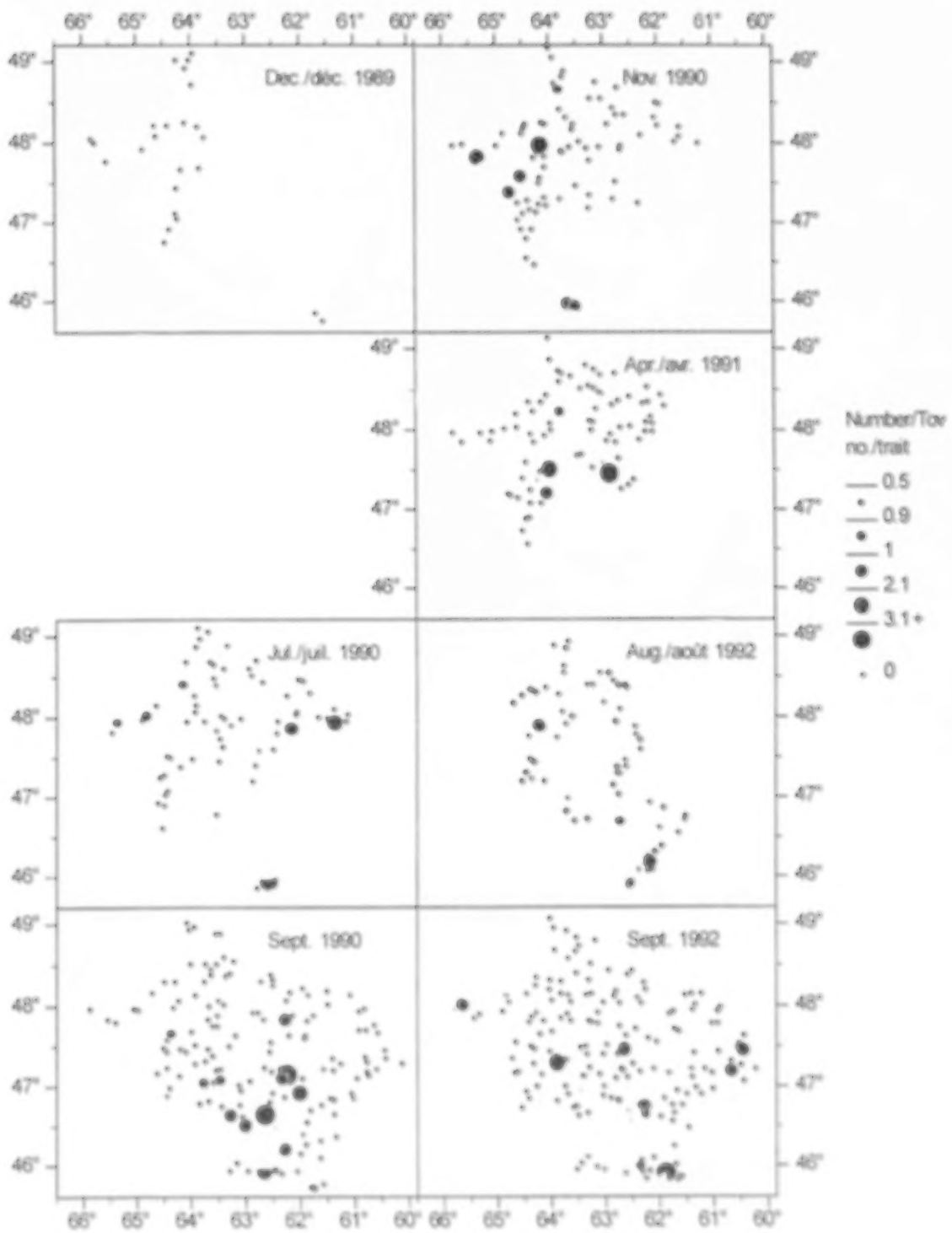

Figure 48d. S.W. Gulf of St. Lawrence seasonal distribution of catches (#/tow) of Shorthorn Sculpin, *Myoxocephalus scorpius*

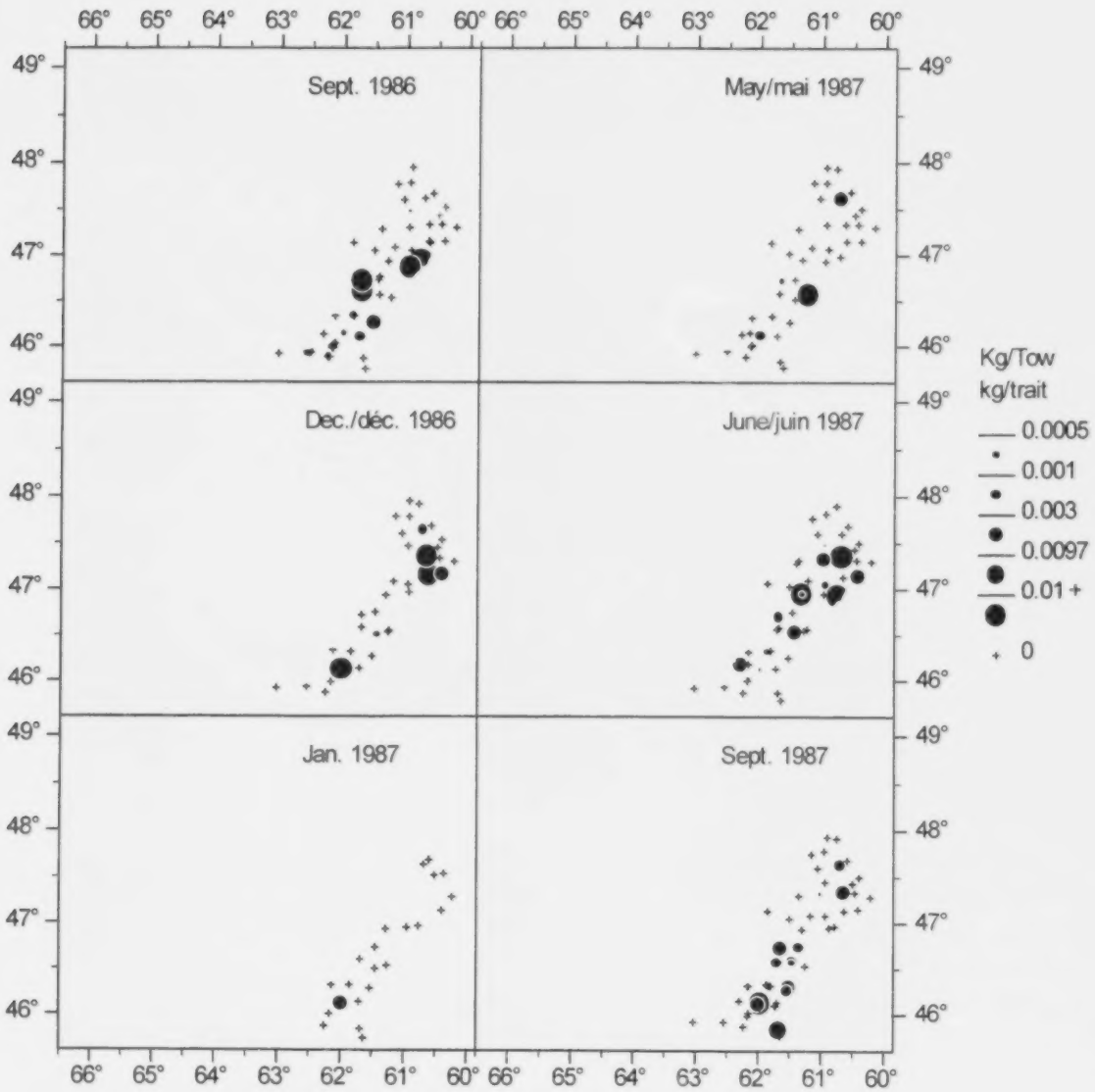

Figure 49a. S.E. Gulf of St. Lawrence seasonal distribution of catches (kg/tow) of Mailed Sculpin, *Triglops murrayi*

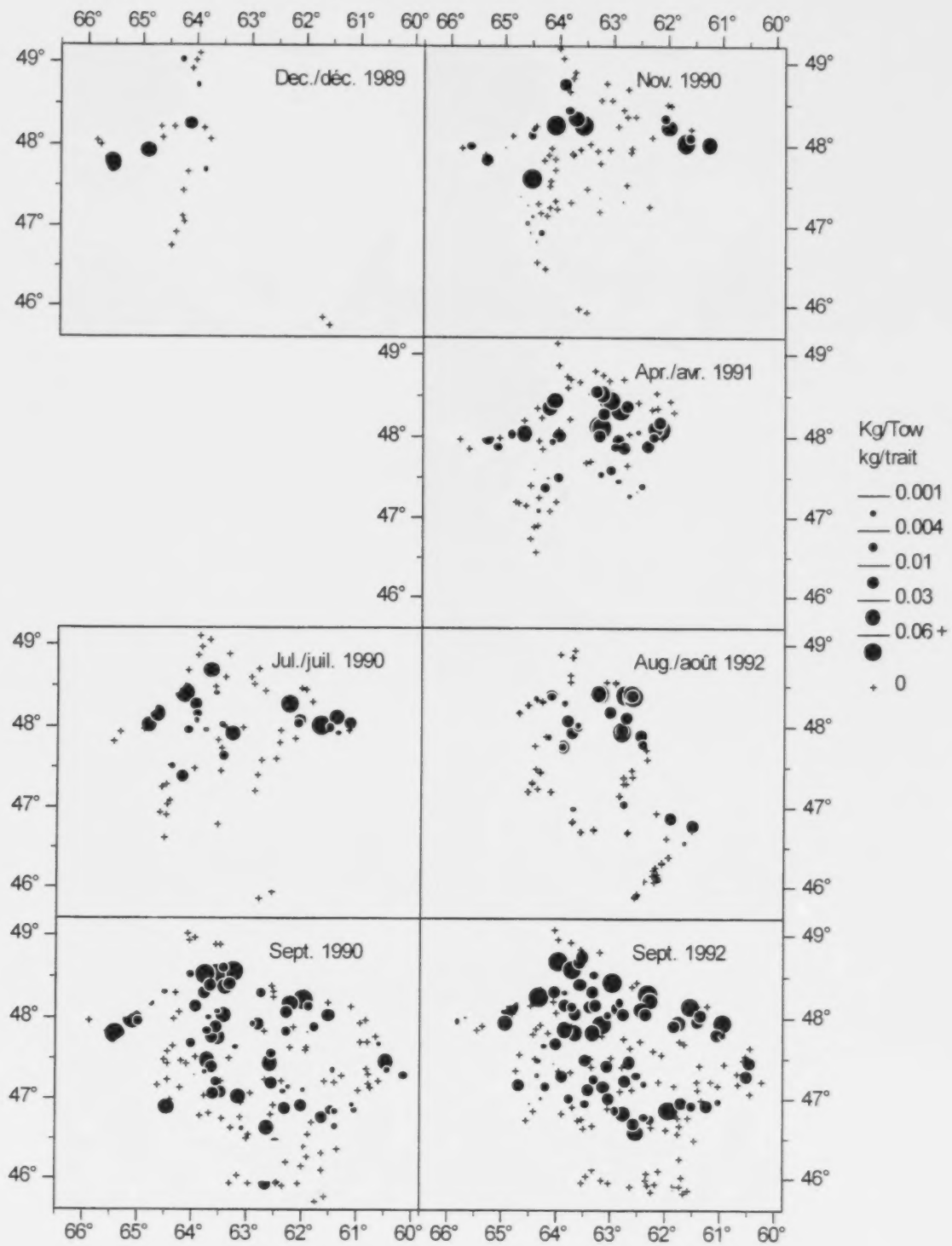

Figure 49b. S.W. Gulf of St. Lawrence seasonal distribution of catches (kg/tow) of Mailed Sculpin, *Triglops murrayi*

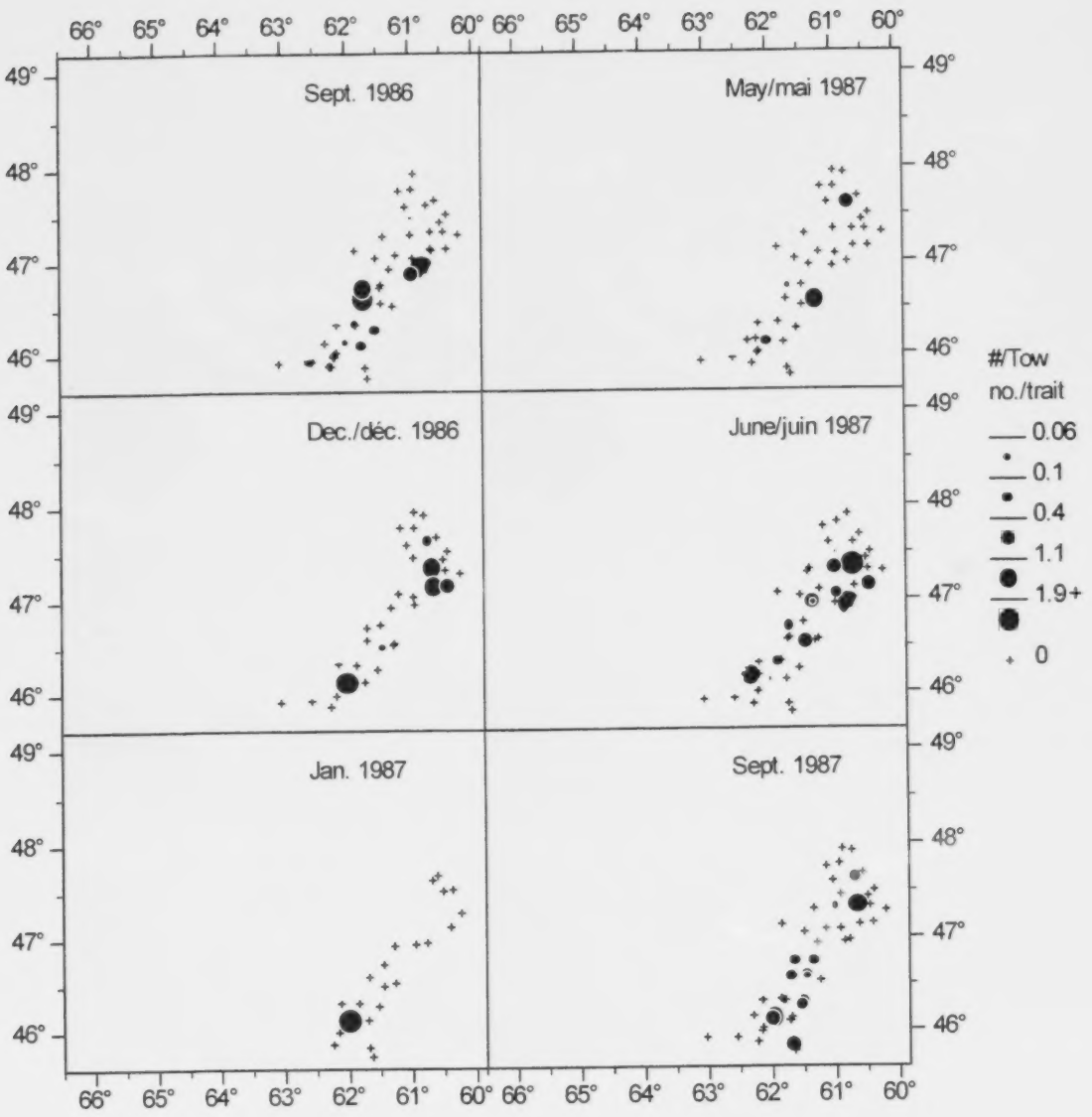

Figure 49c. S.E. Gulf of St. Lawrence seasonal distribution of catches (#/tow) of Mailed Sculpin, *Triglops murrayi*

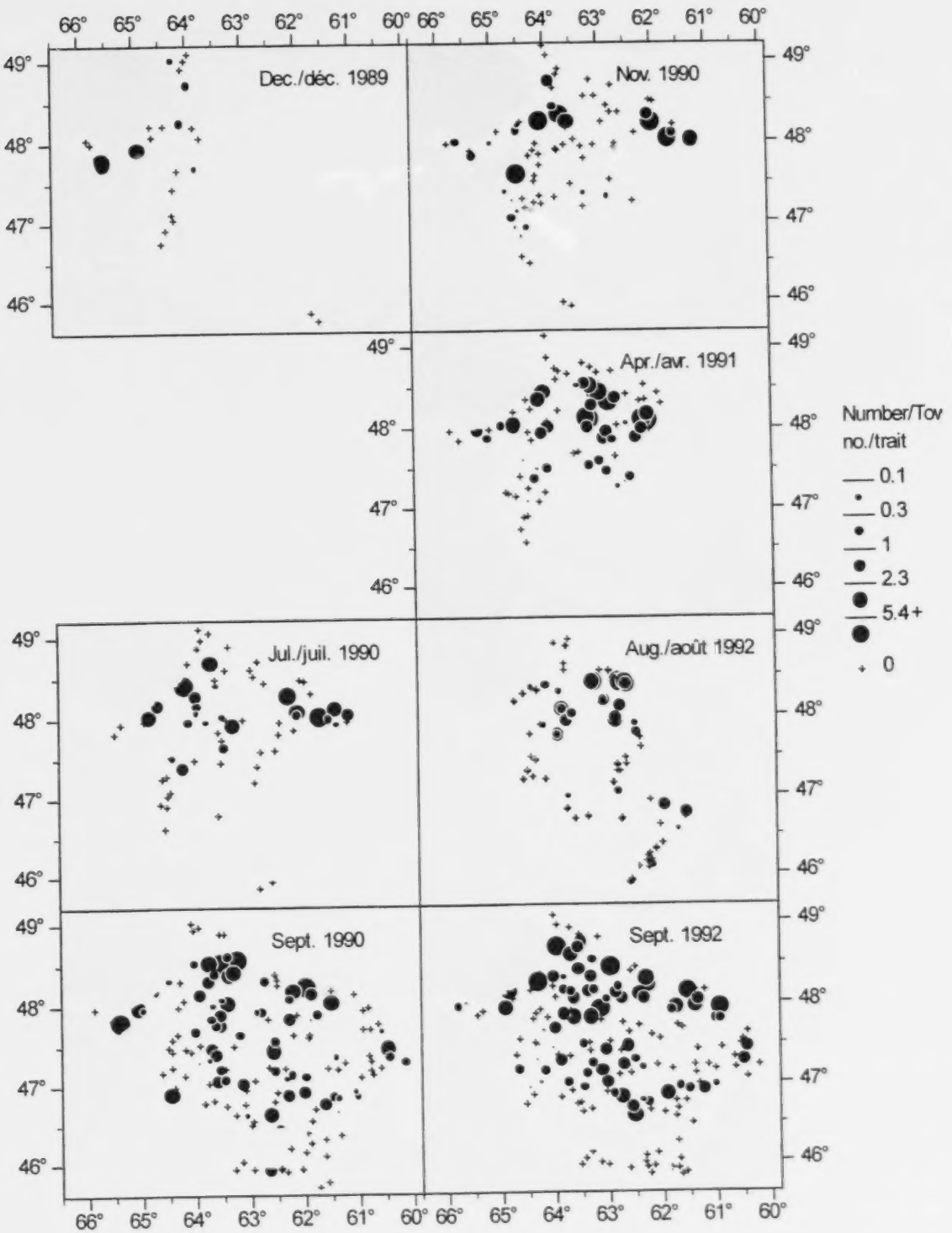

Figure 49d. S.W. Gulf of St. Lawrence seasonal distribution of catches (#/tow) of Mailed Sculpin, *Triglops murrayi*

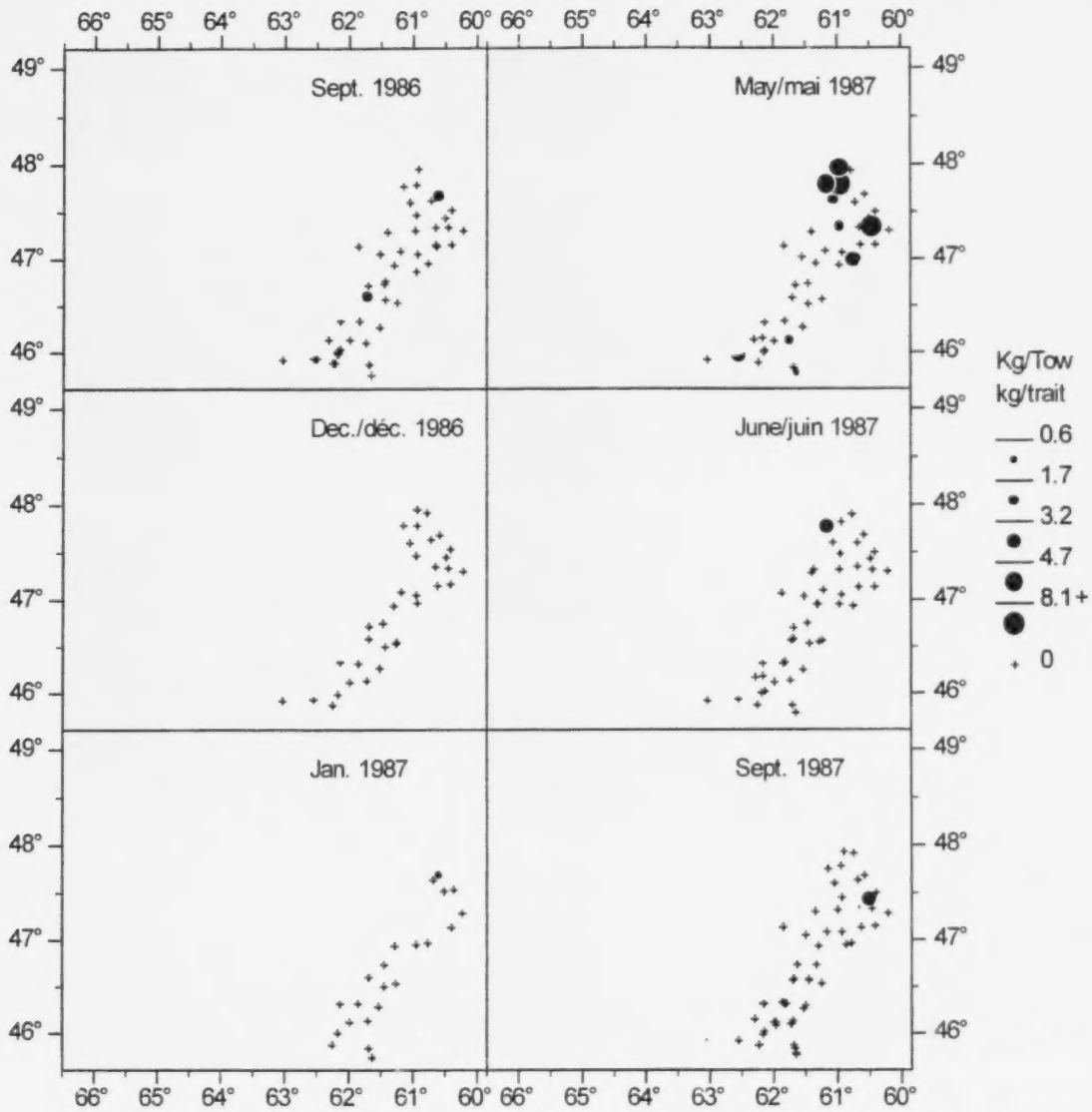

Figure 50a. S.E. Gulf of St. Lawrence seasonal distribution of catches (kg/tow) of Lumpfish, *Cyclopterus lumpus*

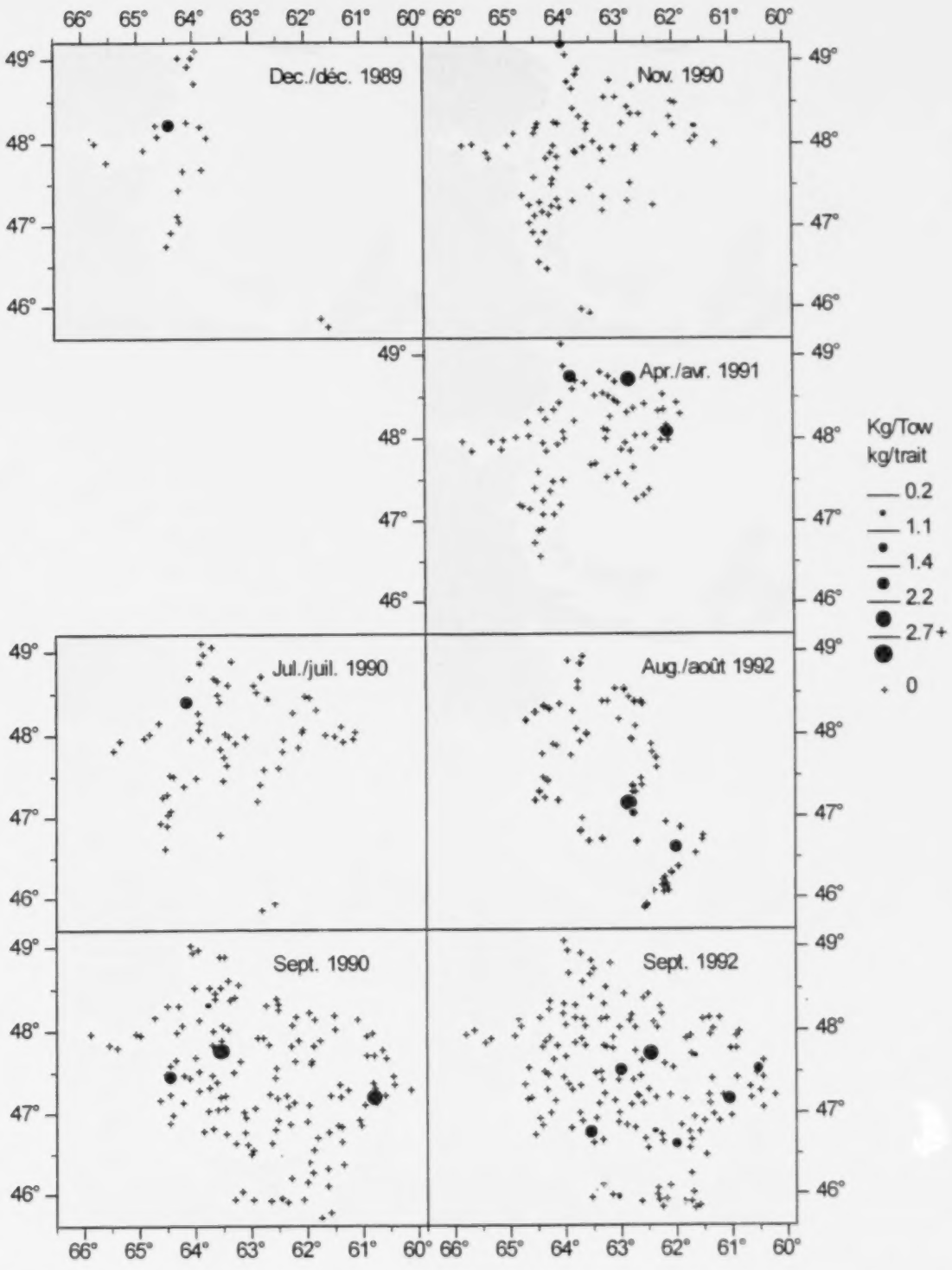

Figure 50b. S.W. Gulf of St. Lawrence seasonal distribution of catches (kg/tow) of Lumpfish, *Cyclopterus lumpus*

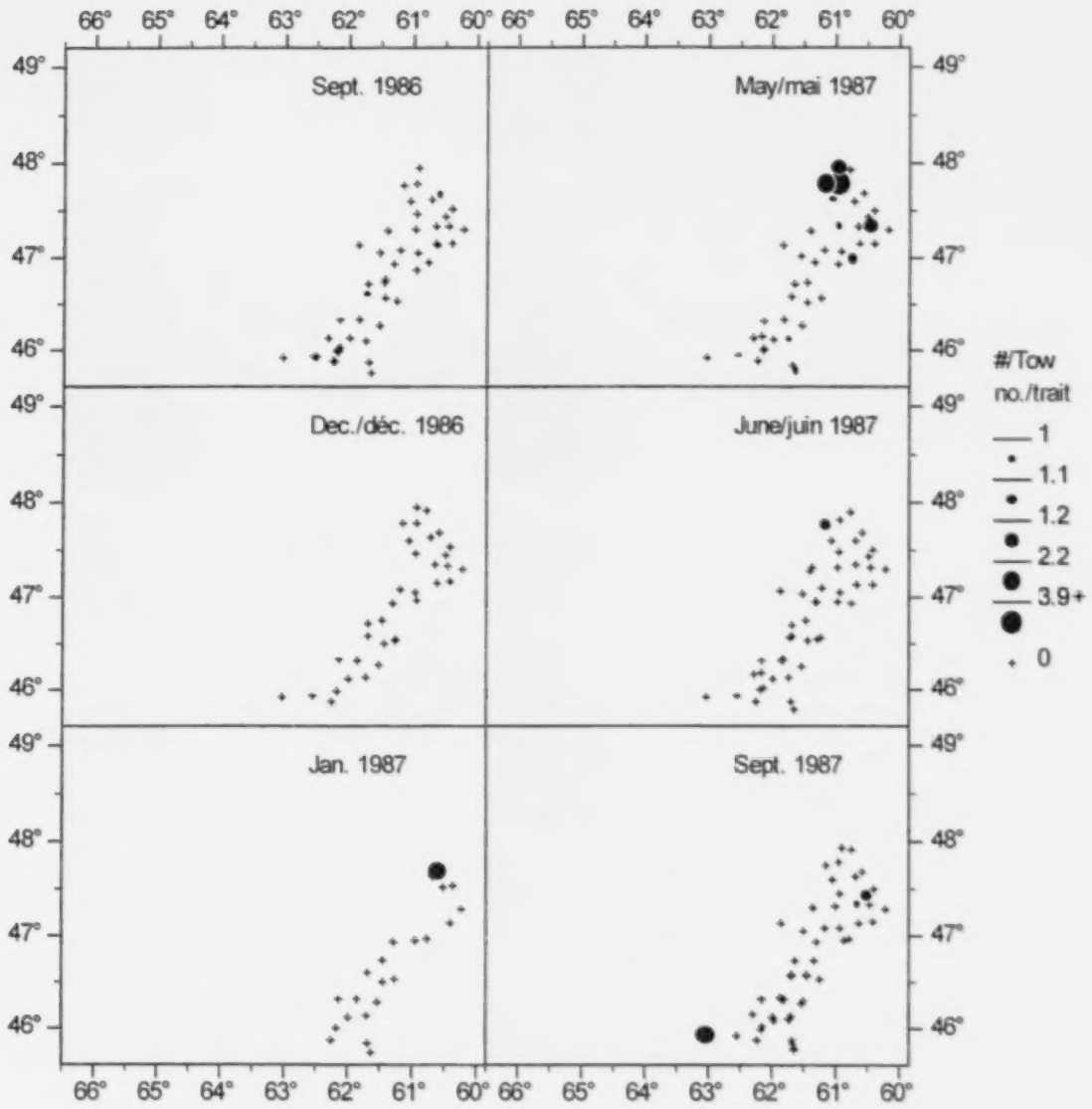

Figure 50c. S.E. Gulf of St. Lawrence seasonal distribution of catches (#/tow) of Lumpfish, *Cyclopterus lumpus*

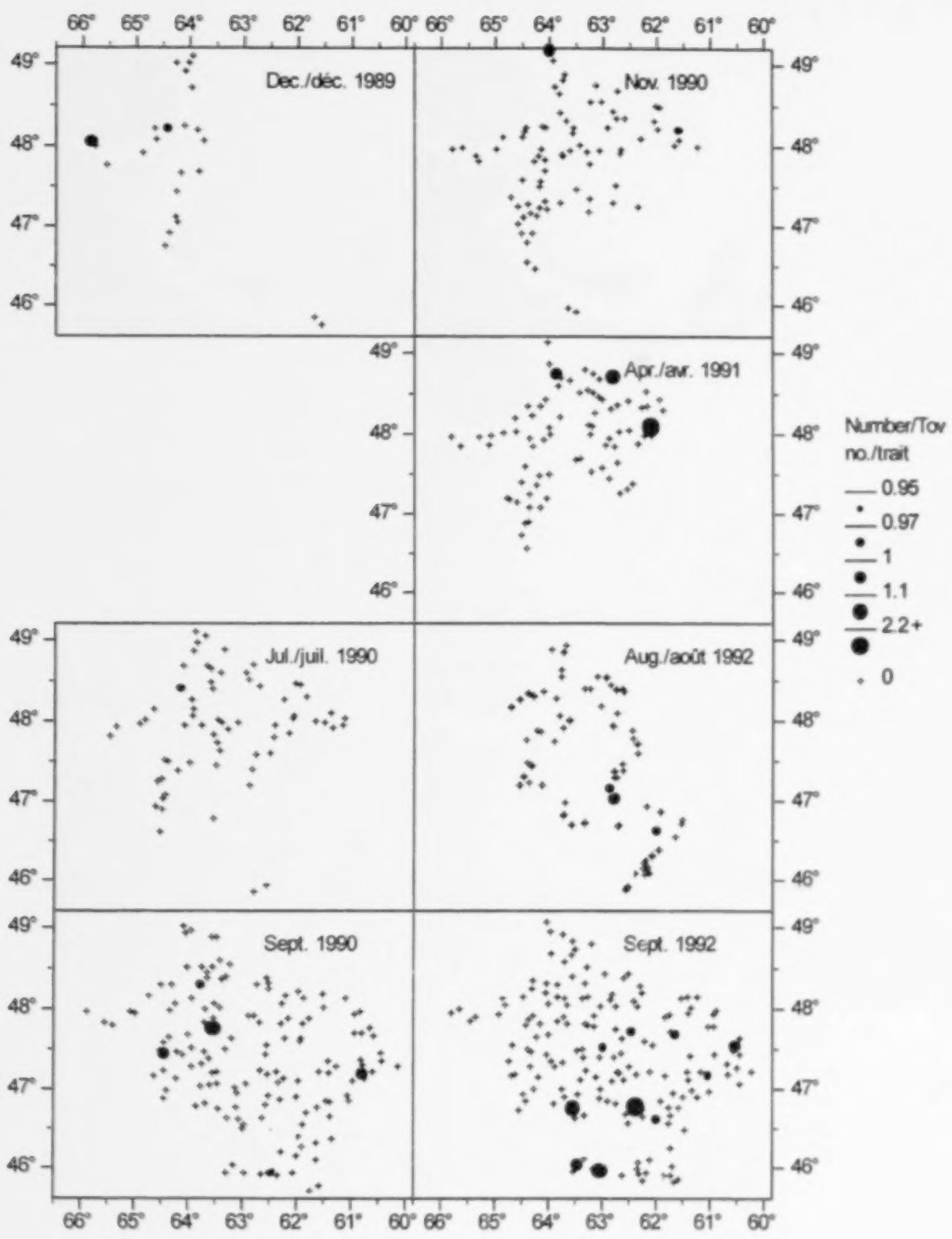

Figure 50d. S.W. Gulf of St. Lawrence seasonal distribution of catches (#/tow) of Lumpfish, *Cyclopterus lumpus*

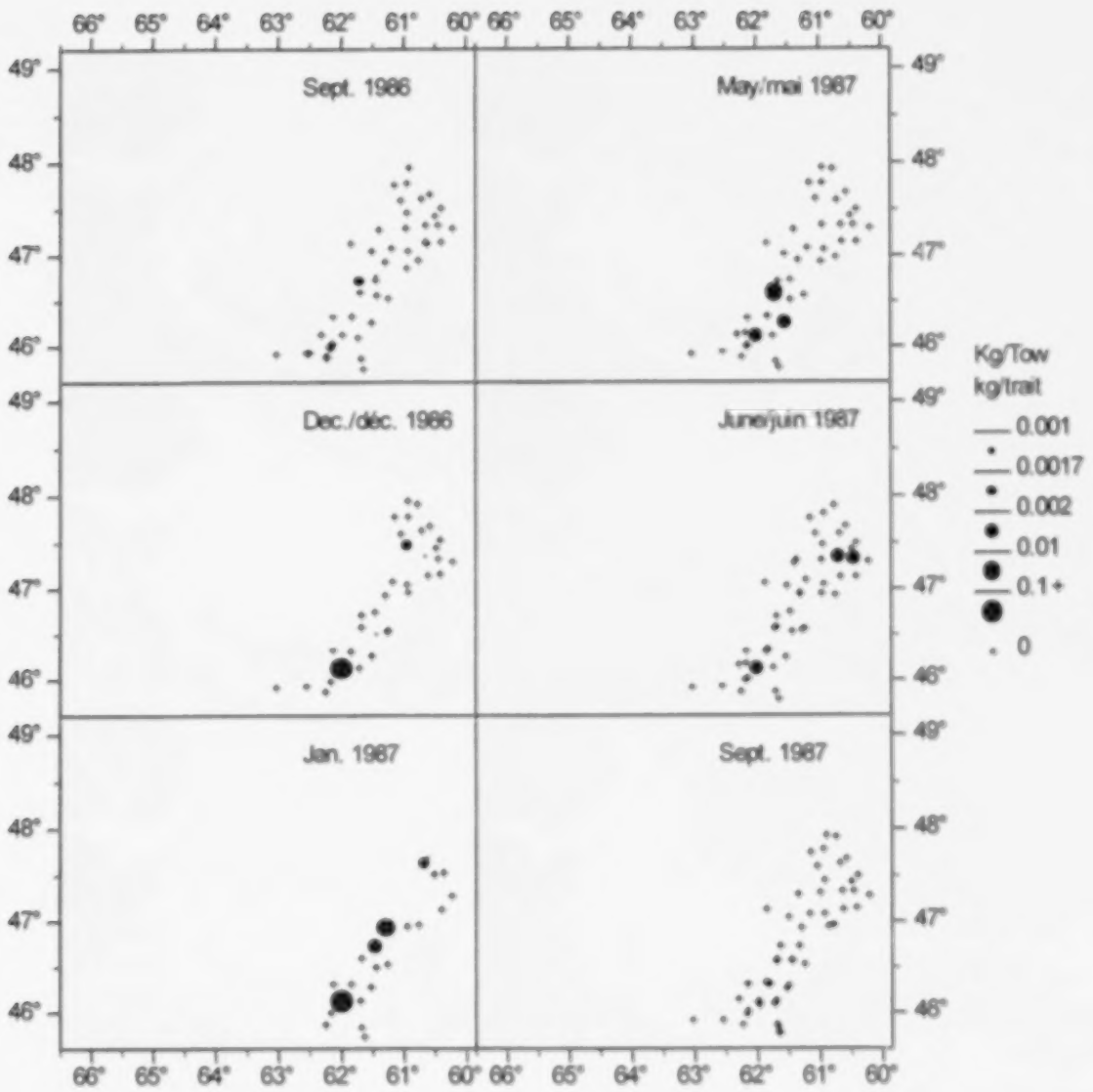

Figure 51a. S.E. Gulf of St. Lawrence seasonal distribution of catches (kg/tow) of Atlantic Spiny Lumpsucker, *Eumicrotremus spinosus*

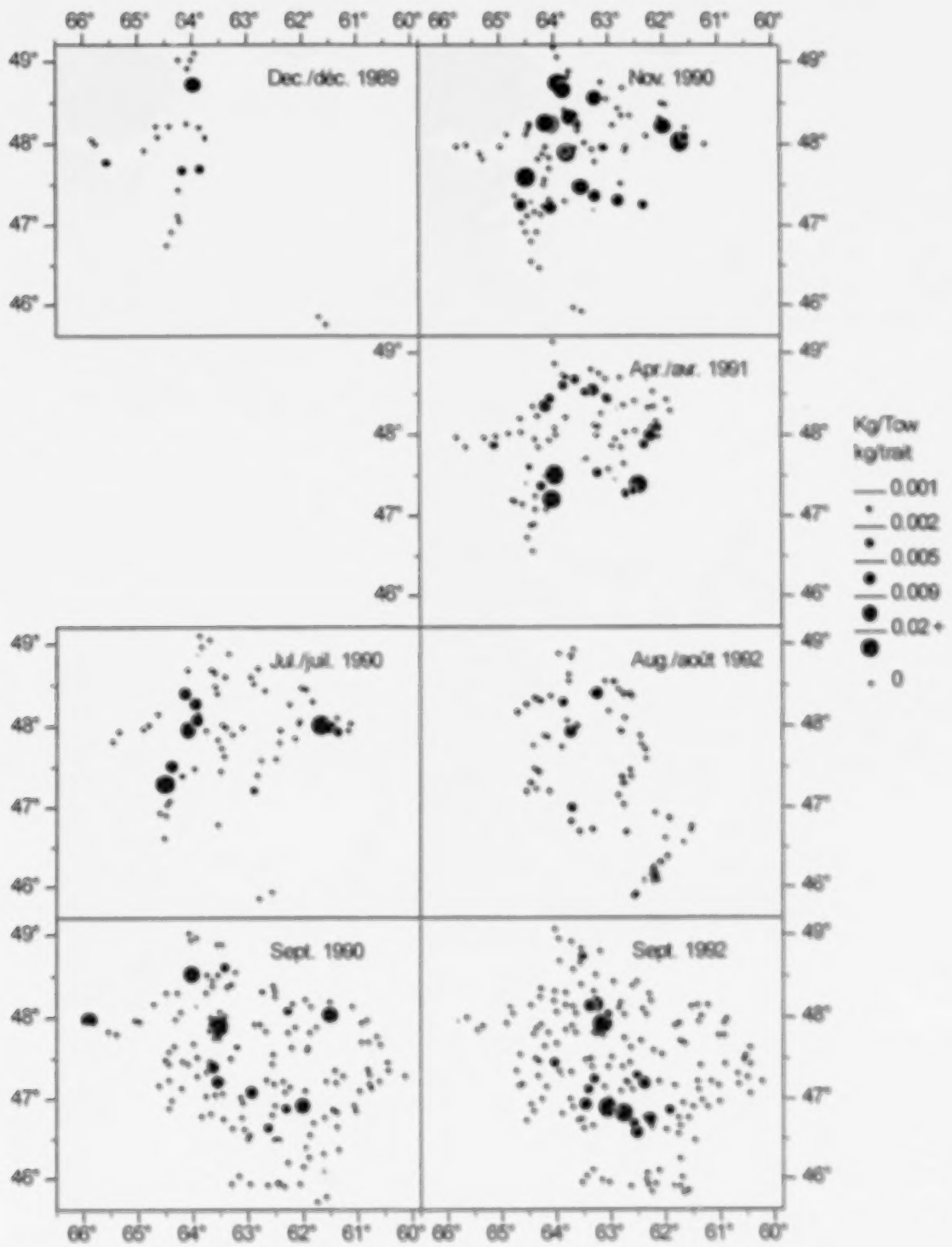

Figure 51b. S.W. Gulf of St. Lawrence seasonal distribution of catches (kg/tow) of Atlantic Spiny Lumpsucker, *Eumicrotremus spinosus*

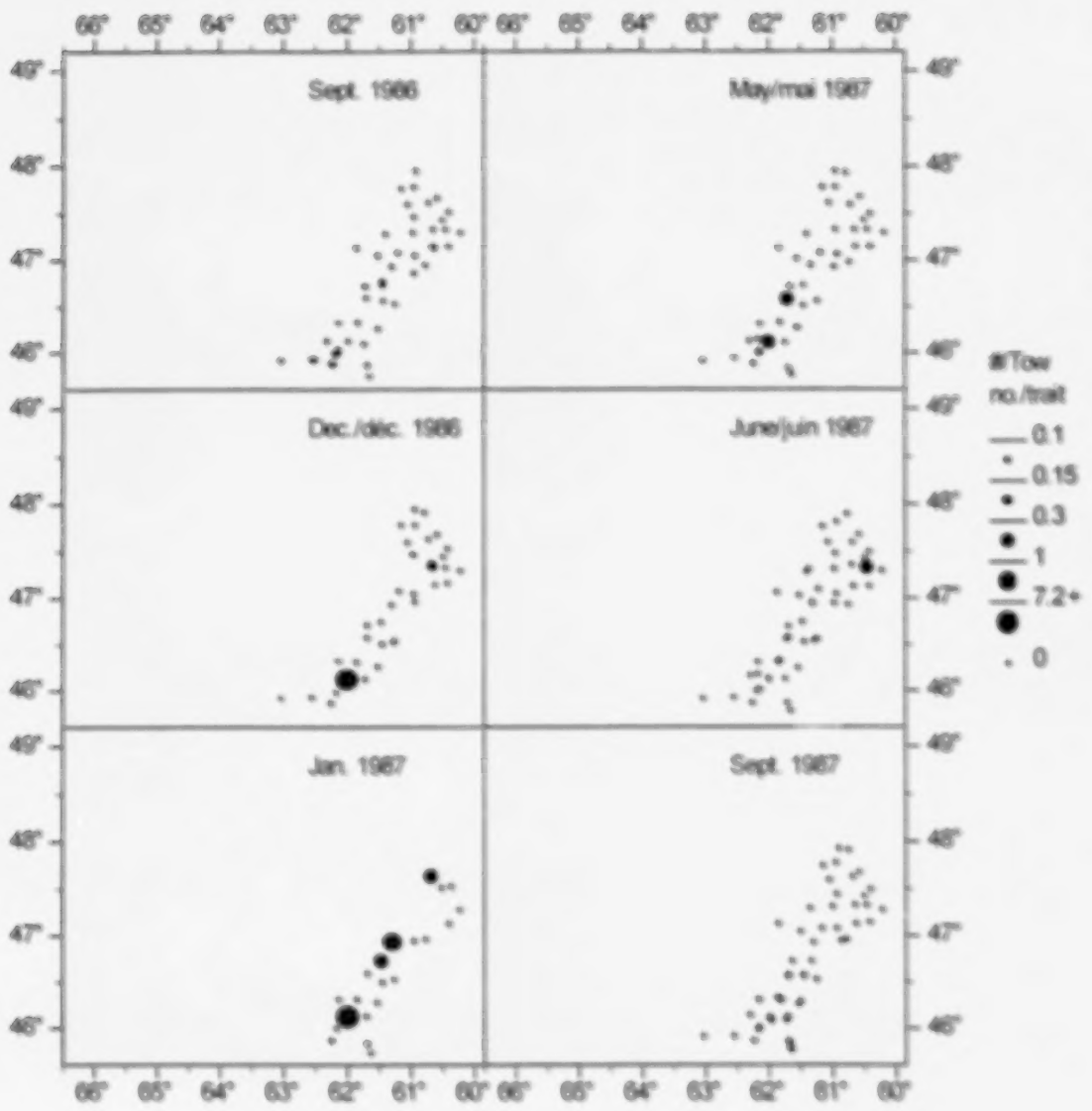

Figure 51c. S.E. Gulf of St. Lawrence seasonal distribution of catches (#/tow) of Atlantic Spiny Lumpsucker, *Eumicrotremus spinosus*

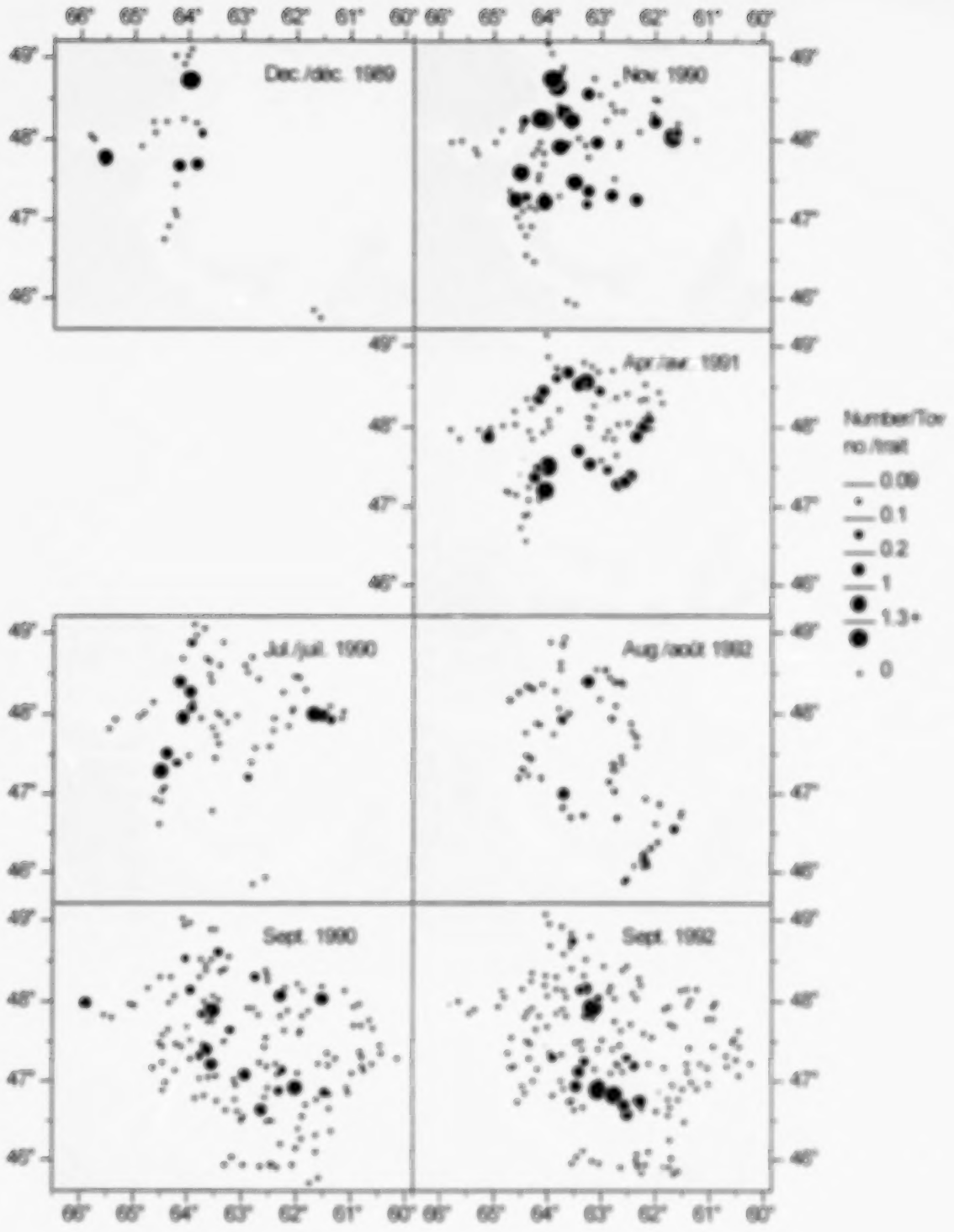

Figure 51d. S.W. Gulf of St. Lawrence seasonal distribution of catches (#/tow) of Atlantic Spiny Lumpsucker, *Eumicrotremus spinosus*

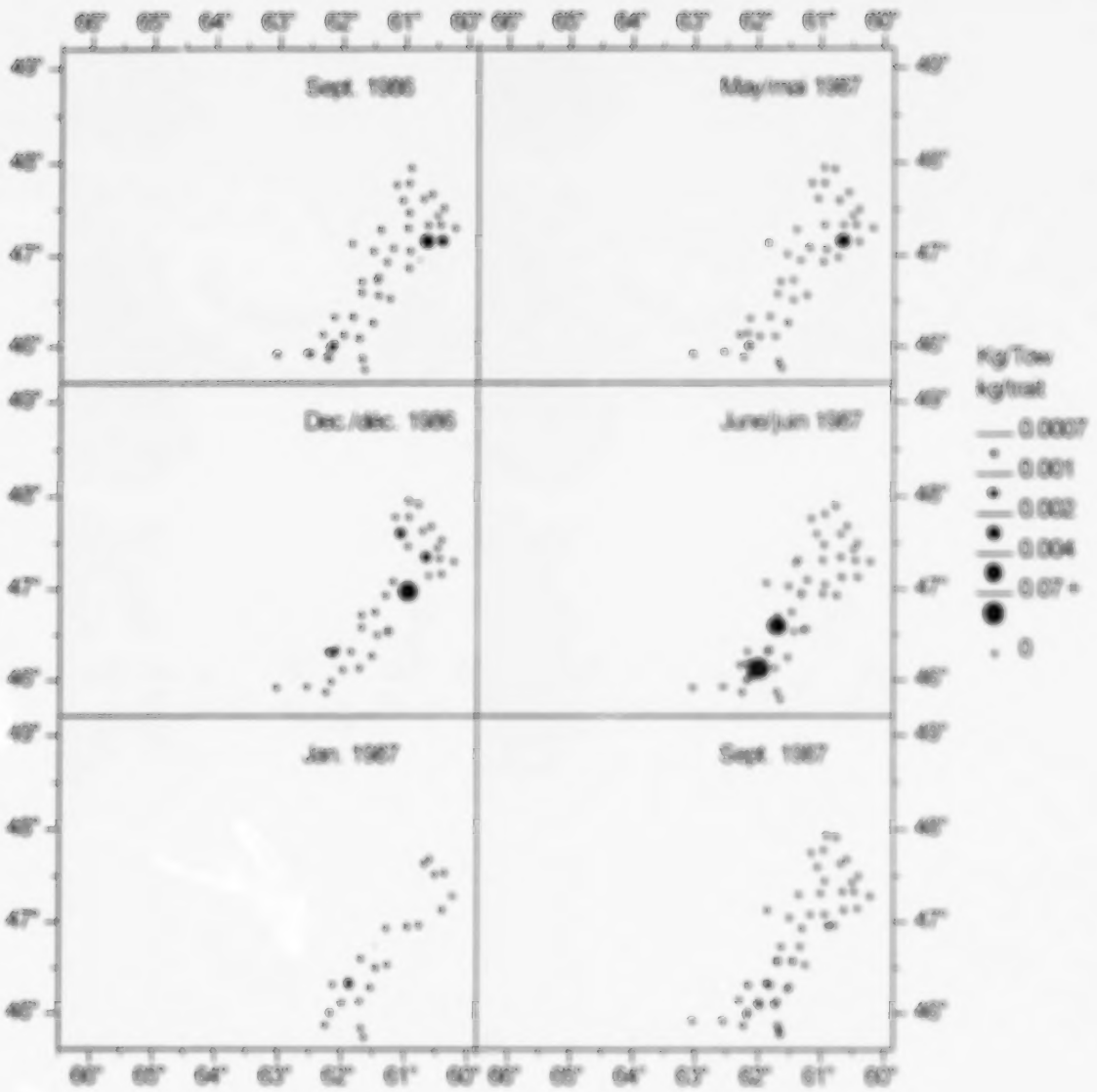

Figure 52a. S.E. Gulf of St. Lawrence seasonal distribution of catches (kg/tow) of Unidentified Seasonal, *Liparis* sp.

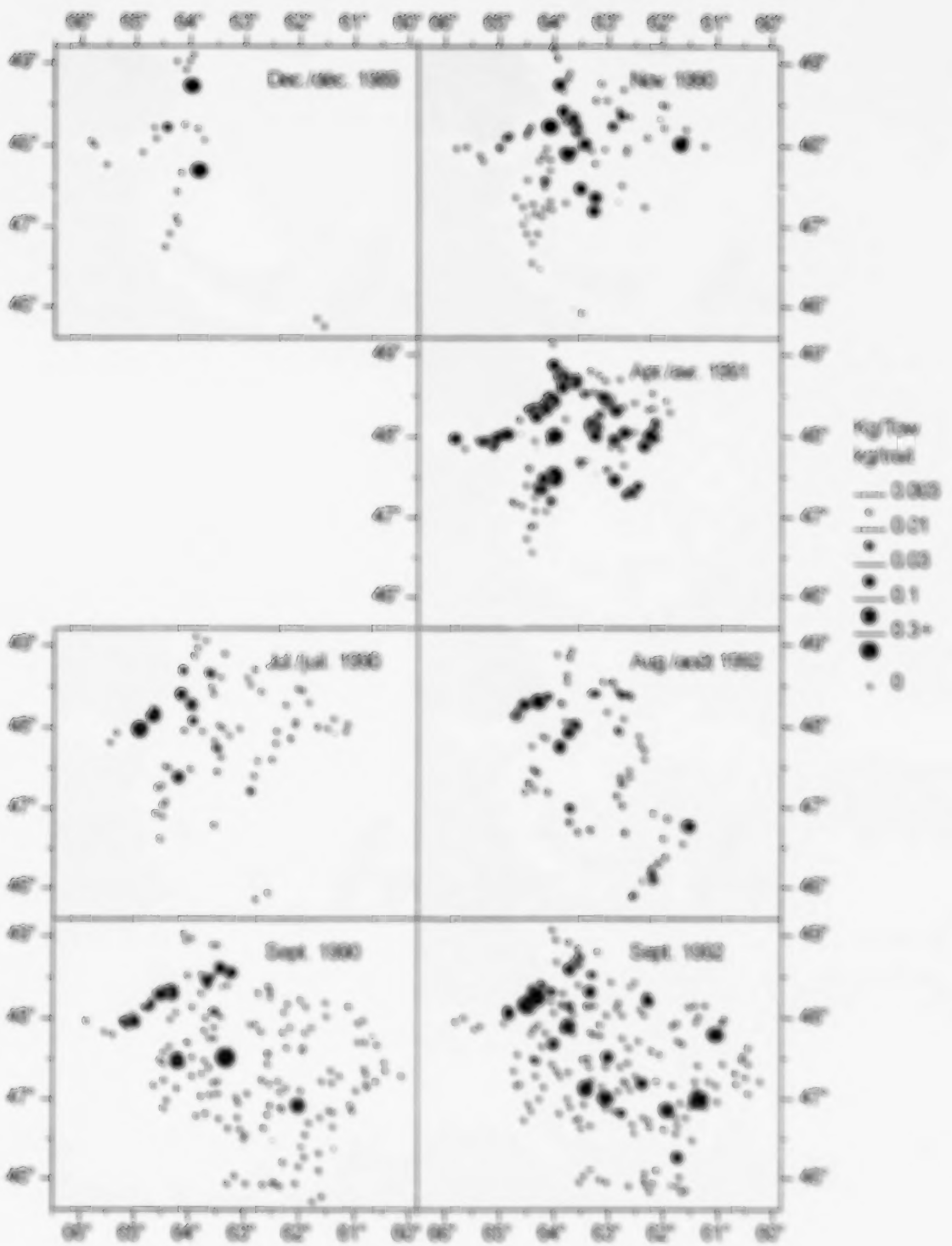

Figure 52b. S.W. Gulf of St. Lawrence seasonal distribution of catches (kg/tow) of Unidentified Seasnail, *Liparis* sp.

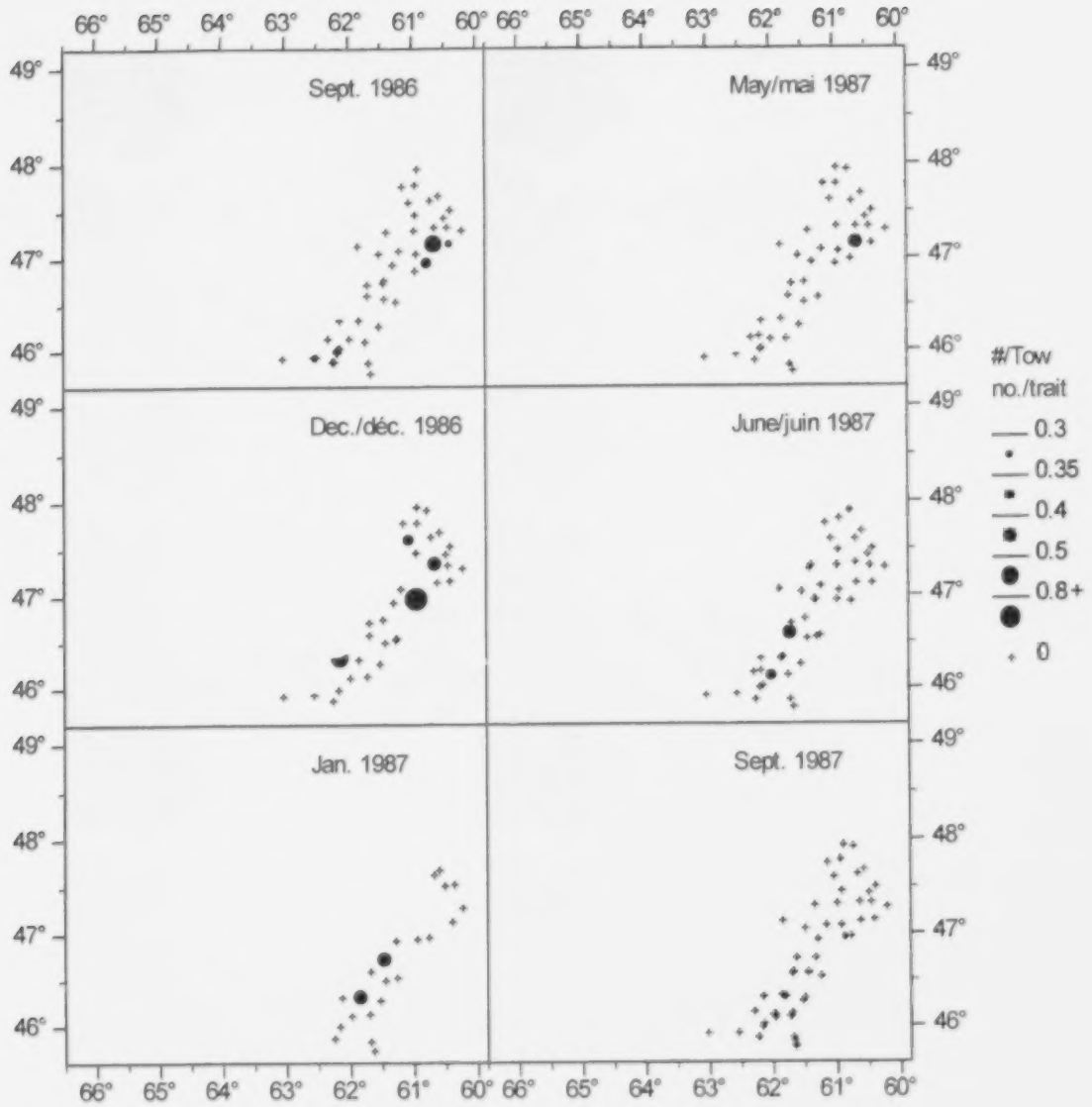

Figure 52c. S.E. Gulf of St. Lawrence seasonal distribution of catches (#/tow) of Unidentified Seasnail, *Liparis sp.*

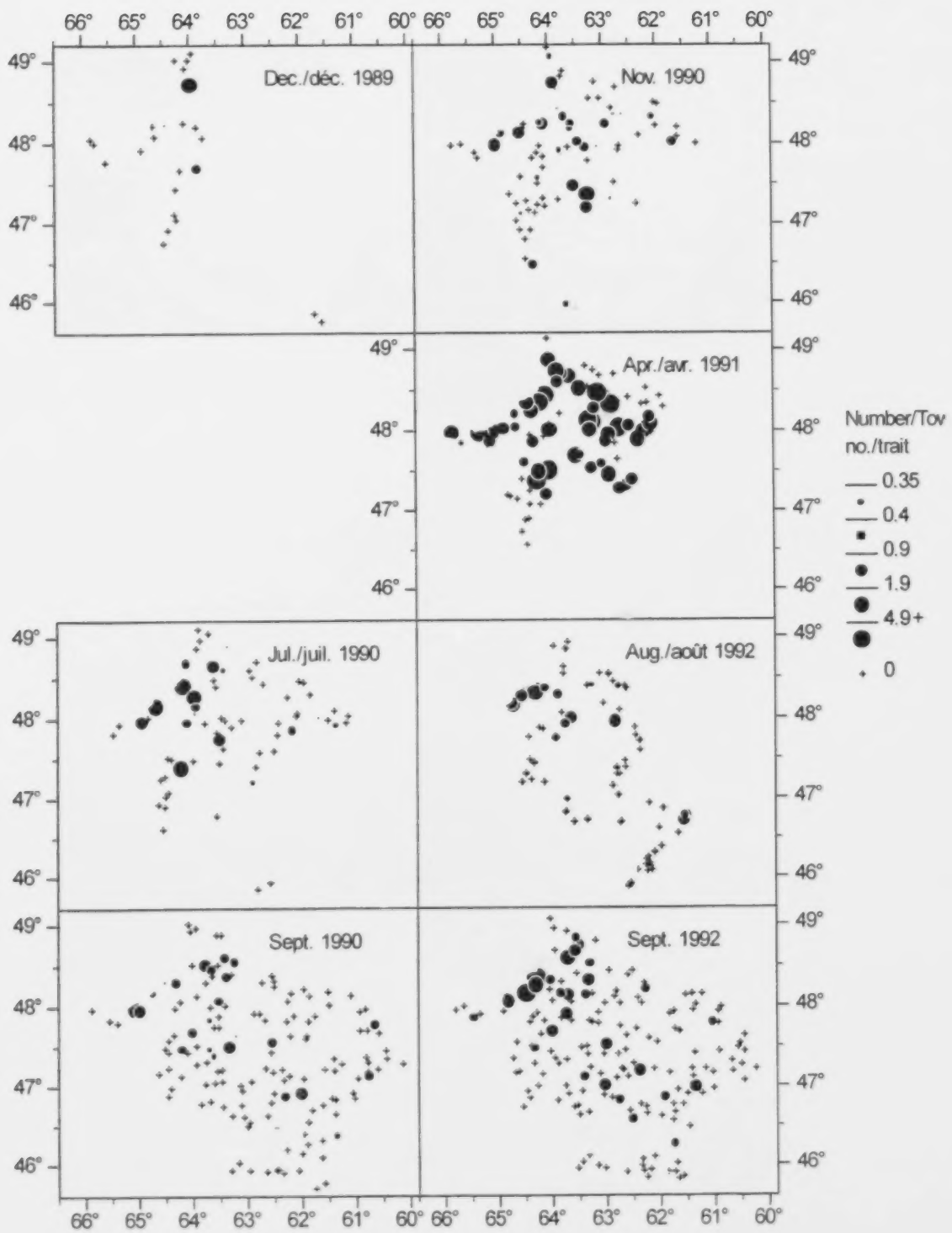

Figure 52d. S.W. Gulf of St. Lawrence seasonal distribution of catches (#/tow) of Unidentified Seasnail, *Liparis sp.*

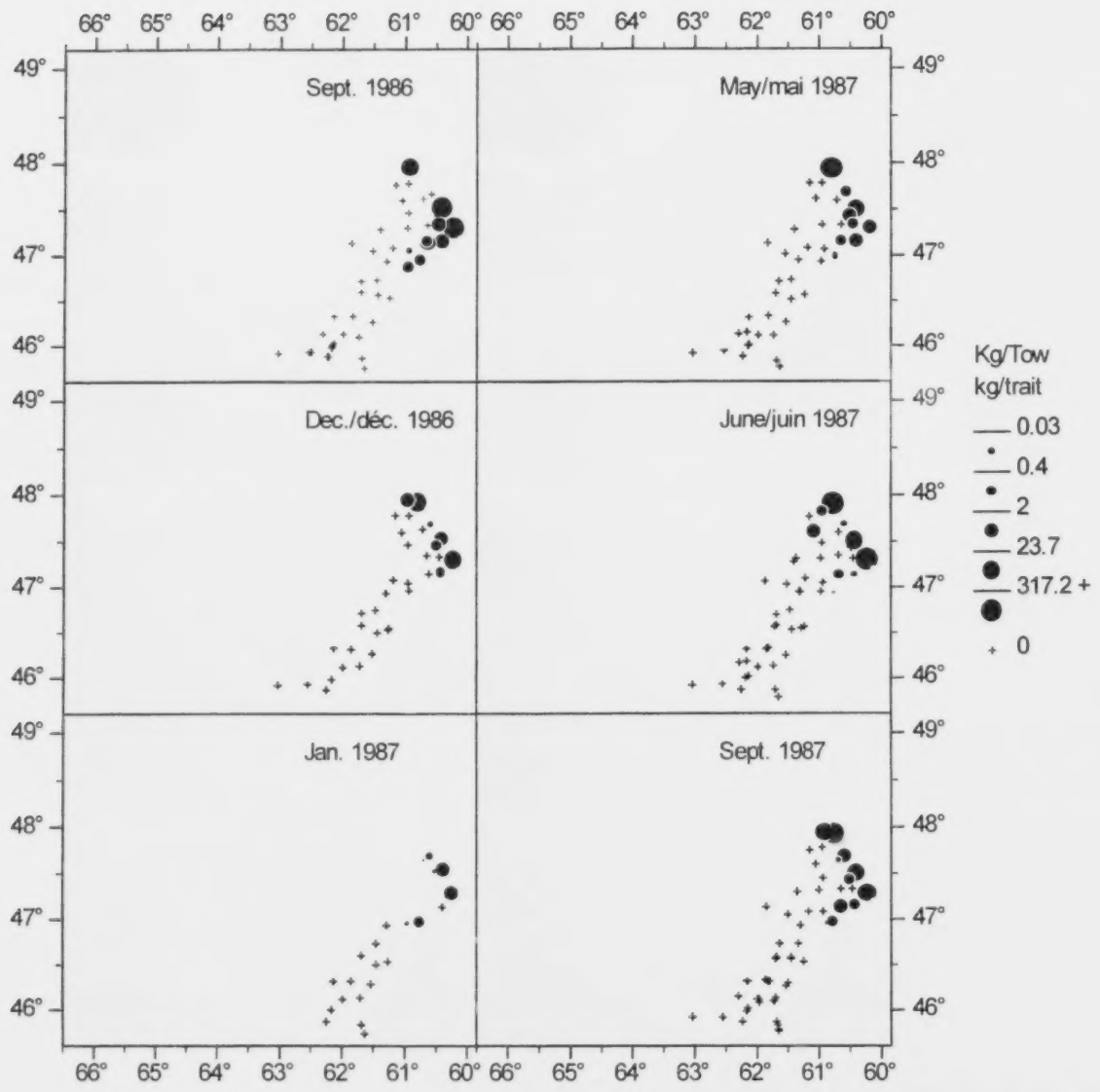

Figure 53a. S.E. Gulf of St. Lawrence seasonal distribution of catches (kg/tow) of Unseperated Redfish, *Sebastes sp.*

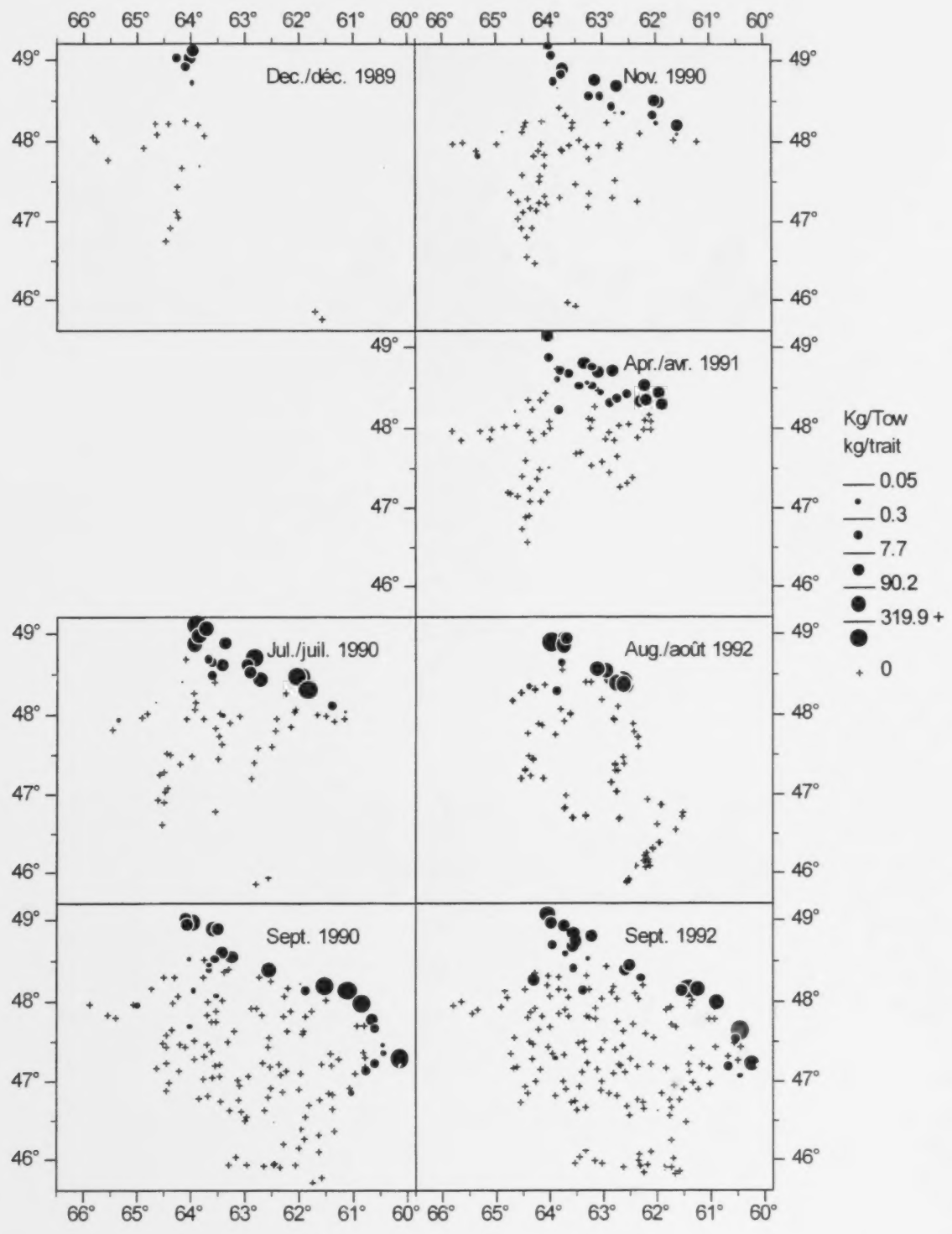

Figure 53b. S.W. Gulf of St. Lawrence seasonal distribution of catches (kg/tow) of Unseperated Redfish, *Sebastes sp.*

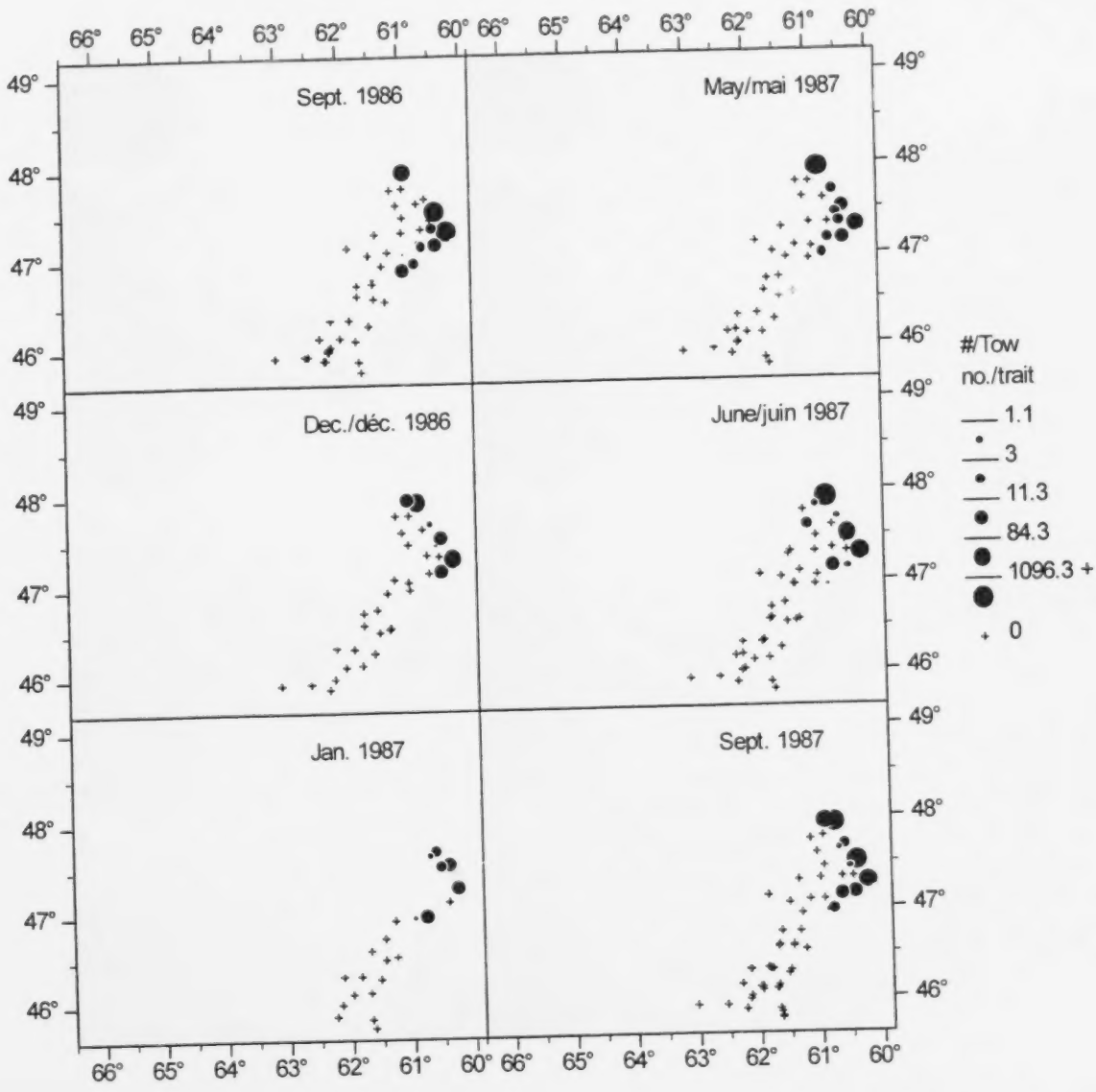

Figure 53c. S.E. Gulf of St. Lawrence seasonal distribution of catches (#/tow) of Unseperated Redfish, *Sebastes sp.*

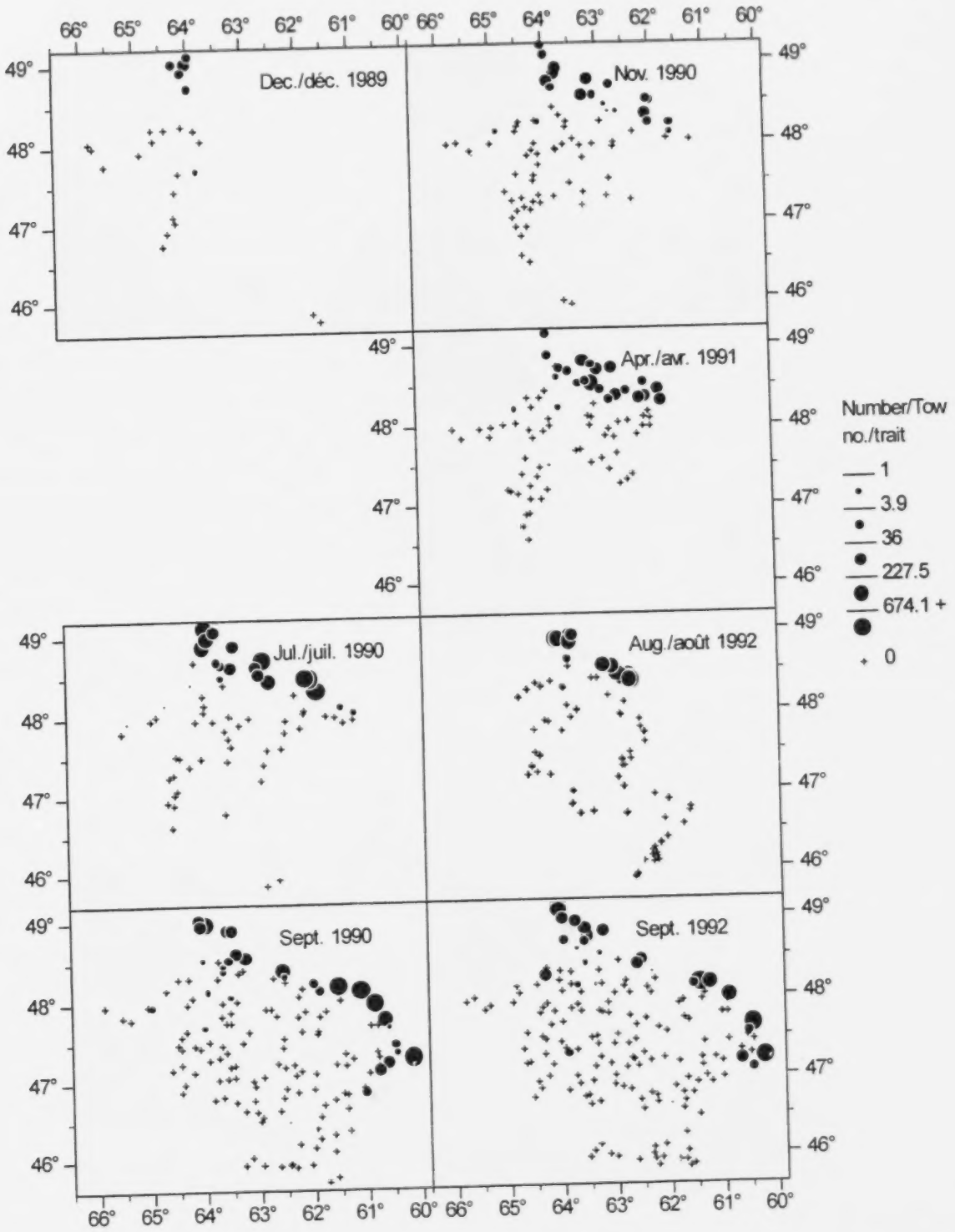

Figure 53d. S.W. Gulf of St. Lawrence seasonal distribution of catches (#/tow) of Unseperated Redfish, *Sebastes sp.*

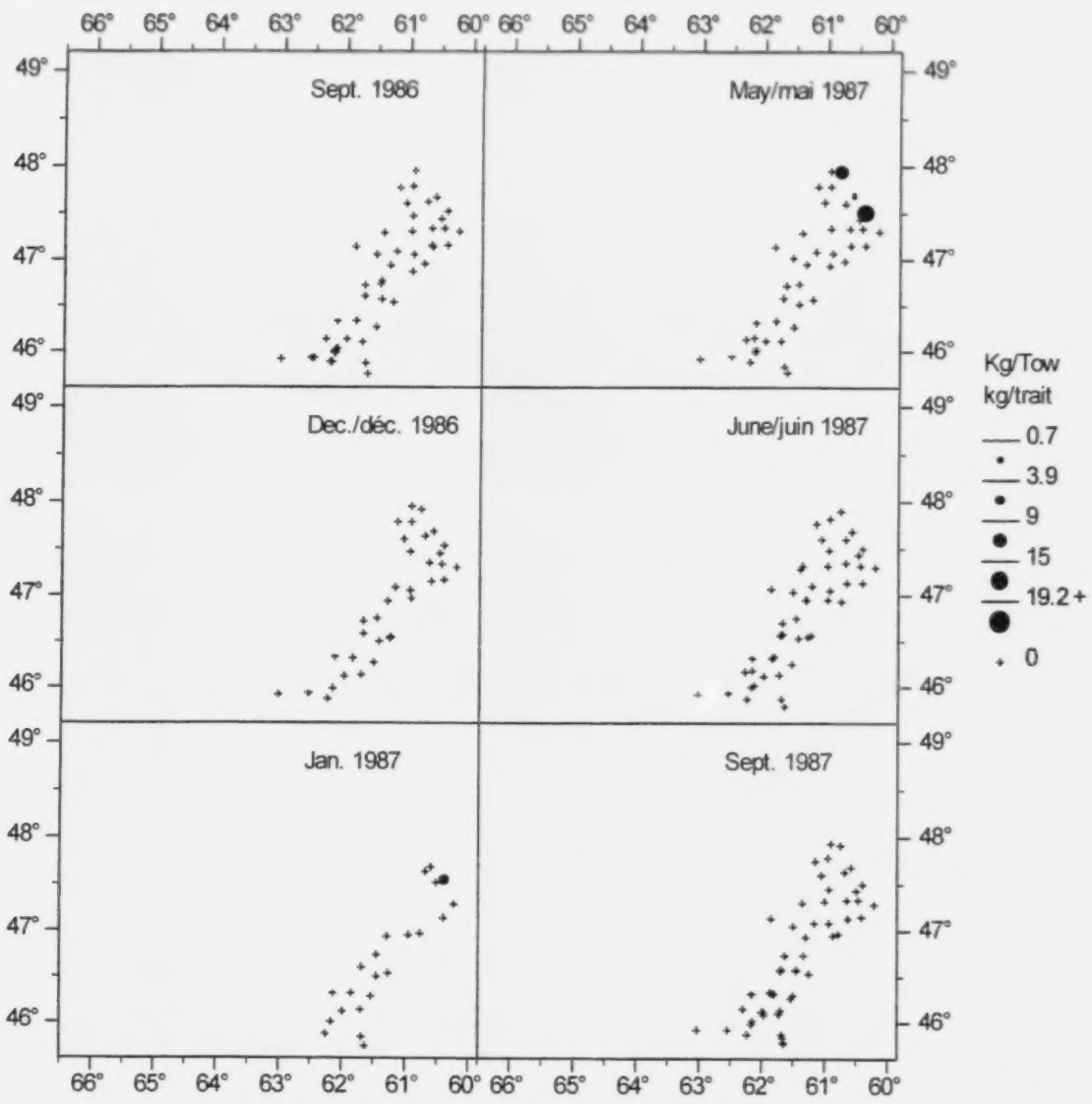

Figure 54a. S.E. Gulf of St. Lawrence seasonal distribution of catches (kg/tow) of Black Dogfish, *Centroscyllium fabricii*

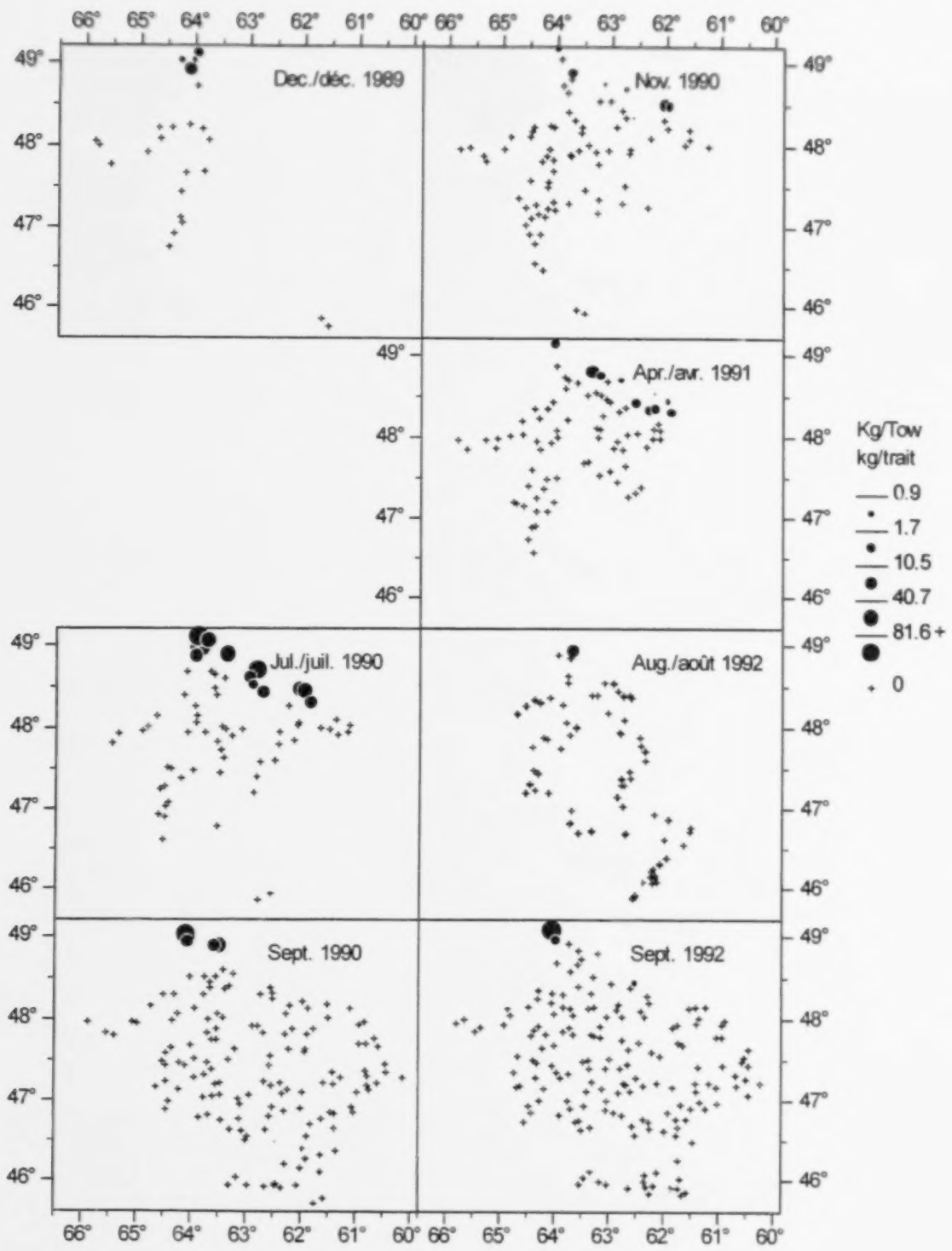

Figure 54b. S.W. Gulf of St. Lawrence seasonal distribution of catches (kg/tow) of Black Dogfish, *Centroscyllium fabricii*

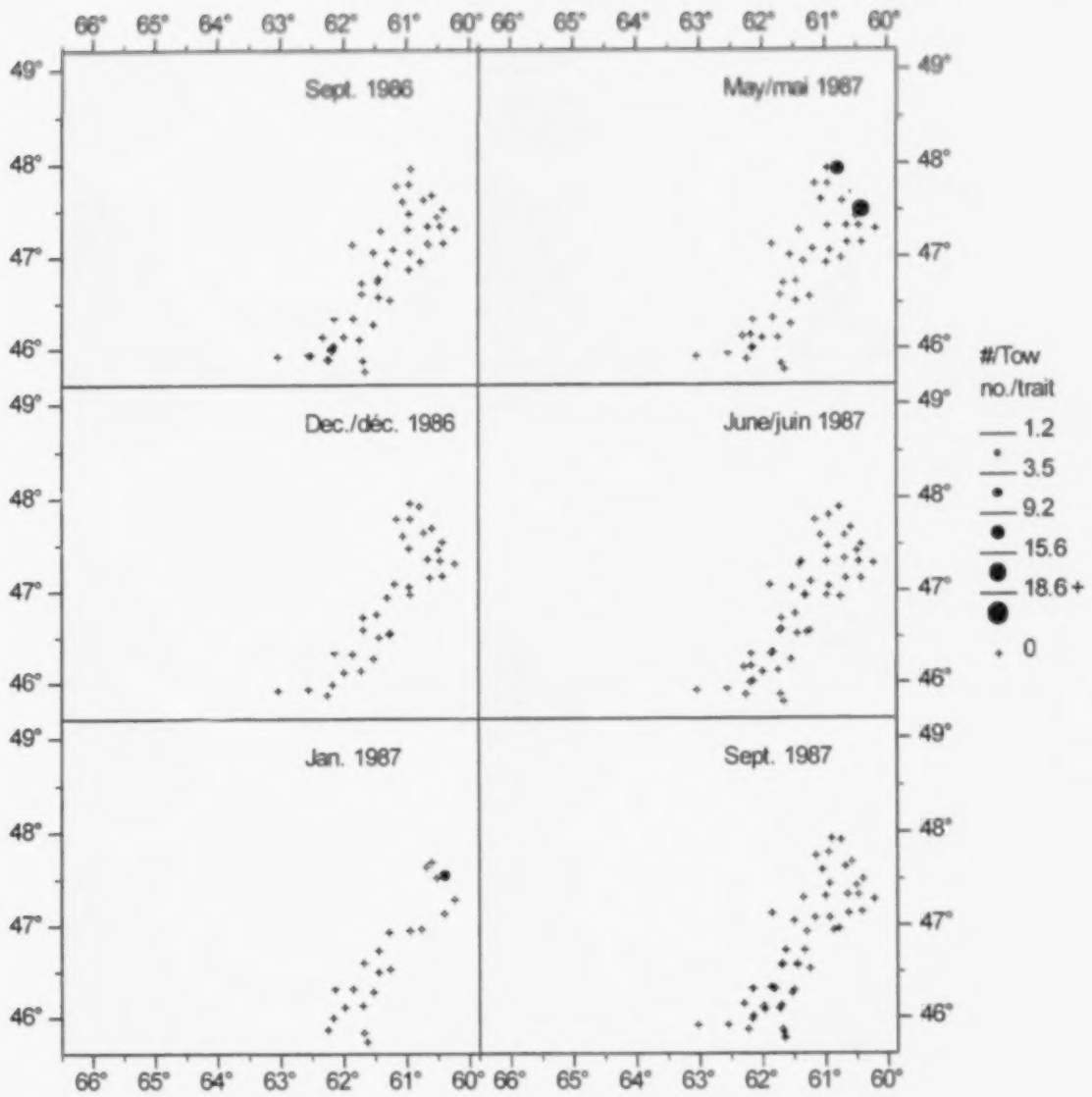

Figure 54c. S.E. Gulf of St. Lawrence seasonal distribution of catches (#/tow) of Black Dogfish, *Centroscyllium fabricii*

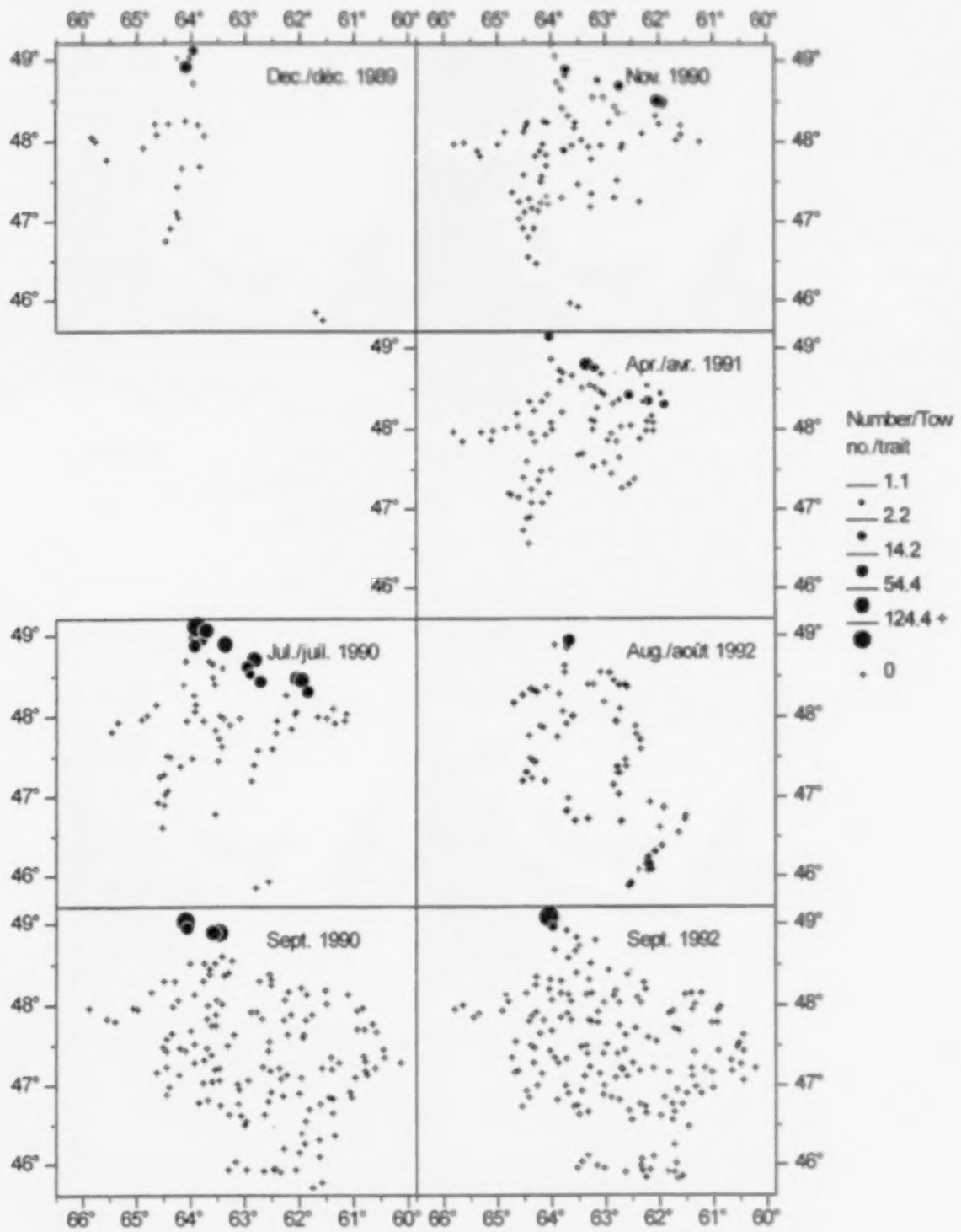

Figure 54d. S.W. Gulf of St. Lawrence seasonal distribution of catches (#/tow) of Black Dogfish, *Centroscyllium fabricii*

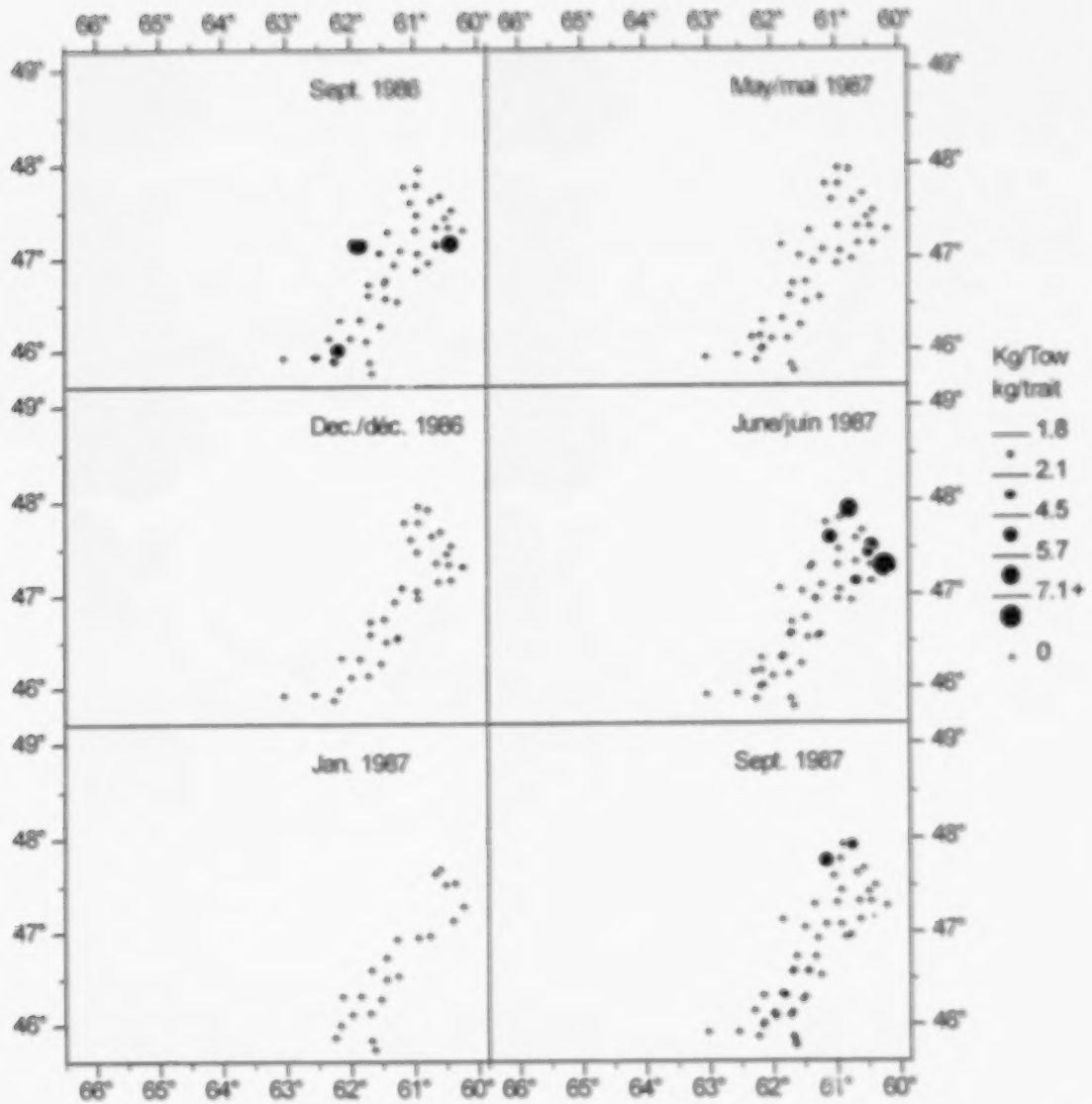

Figure 55a. S.E. Gulf of St. Lawrence seasonal distribution of catches (kg/tow) of Spiny Dogfish, *Squalus acanthias*

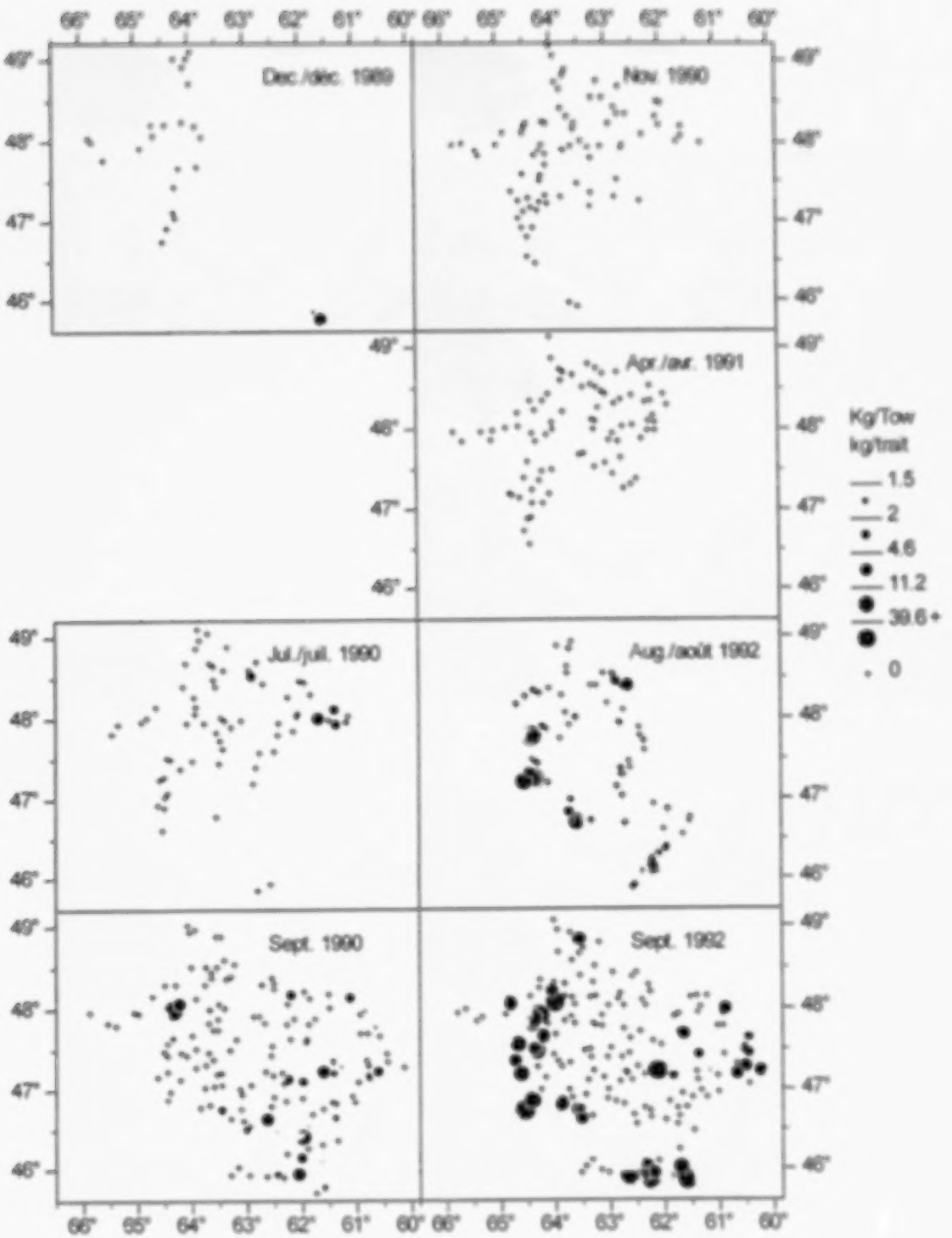

Figure 55b. S.W. Gulf of St. Lawrence seasonal distribution of catches (kg/tow) of Spiny Dogfish, *Squalus acanthias*

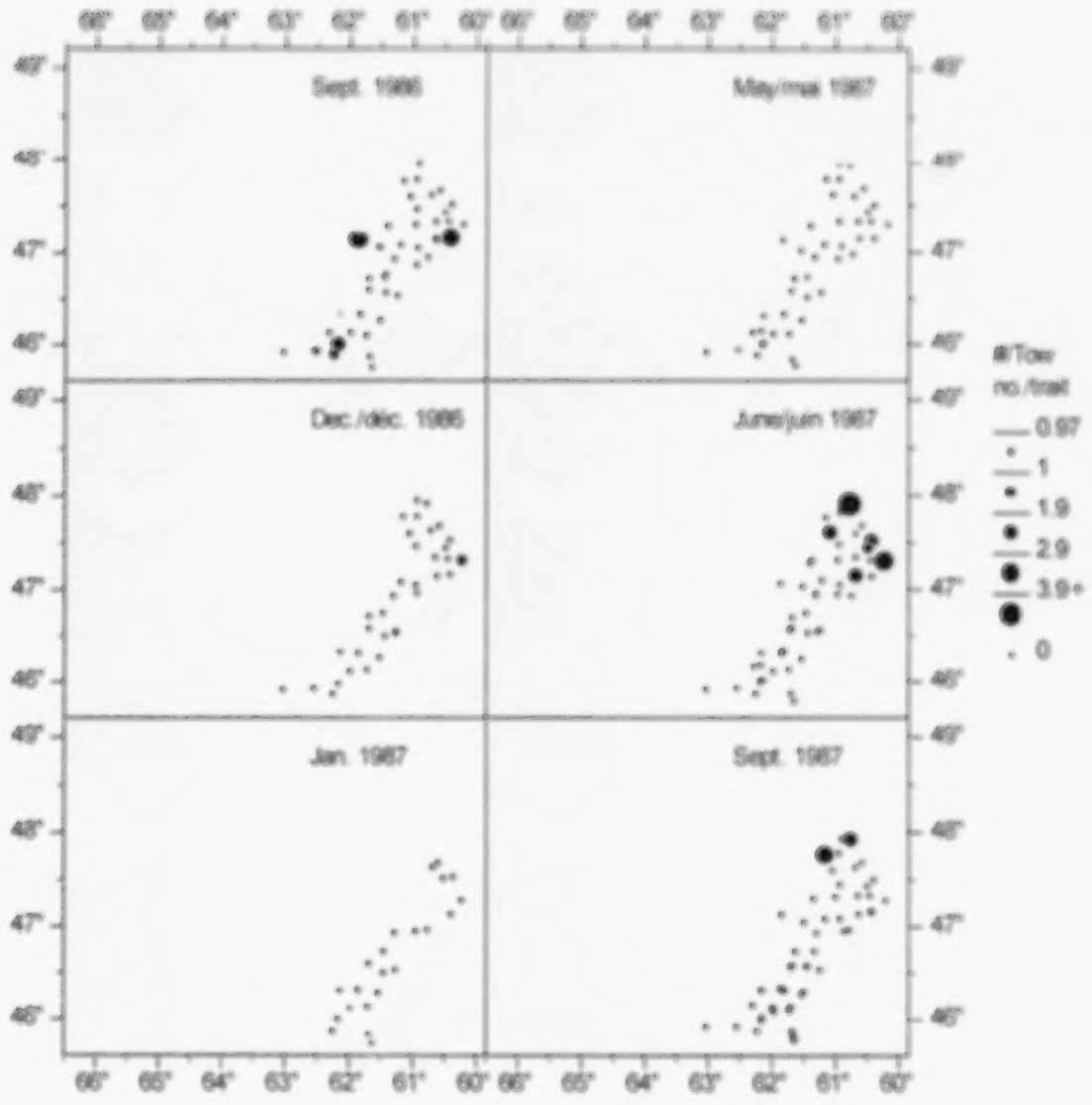

Figure 55c. S.E. Gulf of St. Lawrence seasonal distribution of catches (#/tow) of Spiny Dogfish, *Squalus acanthias*

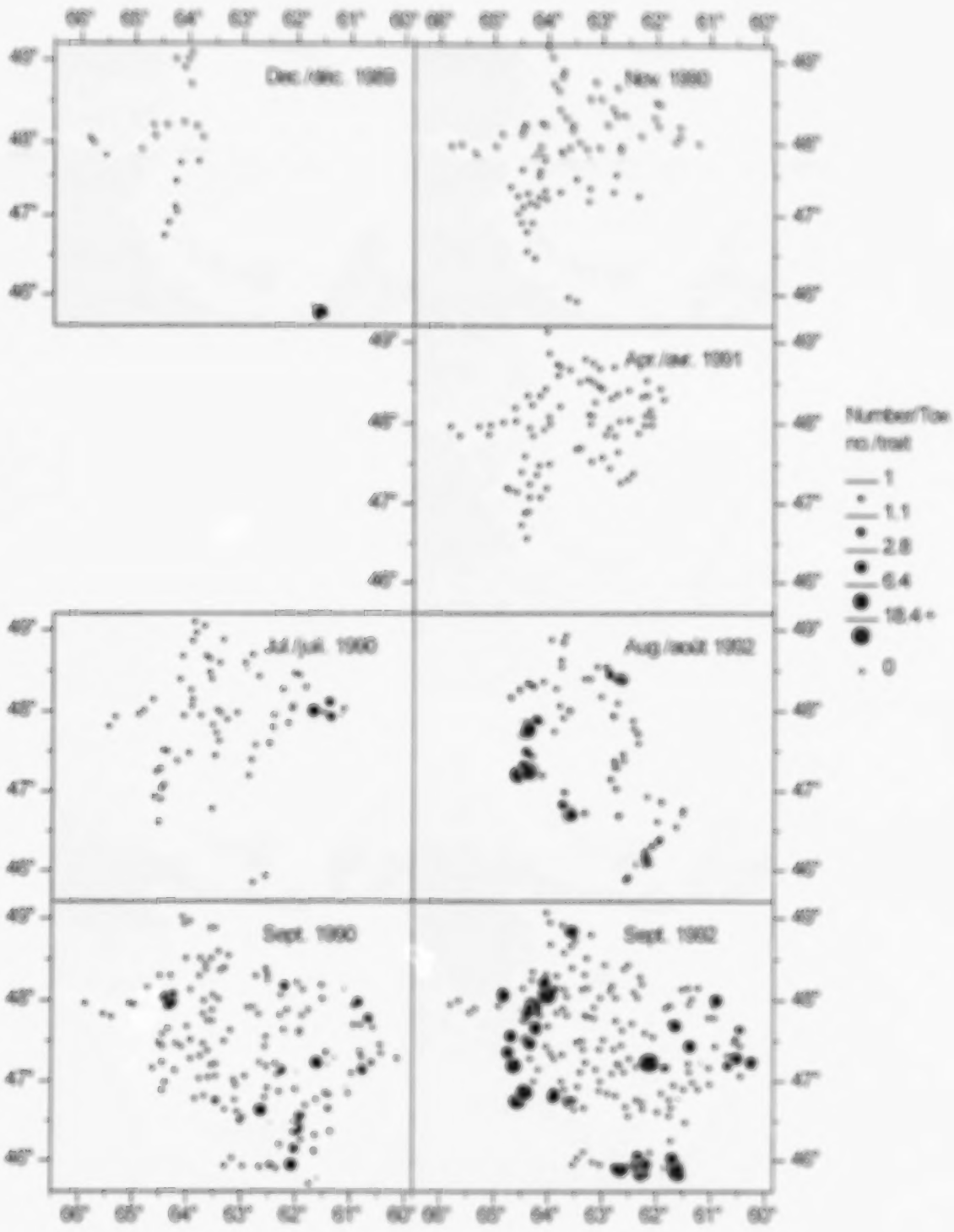

Figure 55d. S.W. Gulf of St. Lawrence seasonal distribution of catches (#/tow) of Spiny Dogfish, *Squalus acanthias*

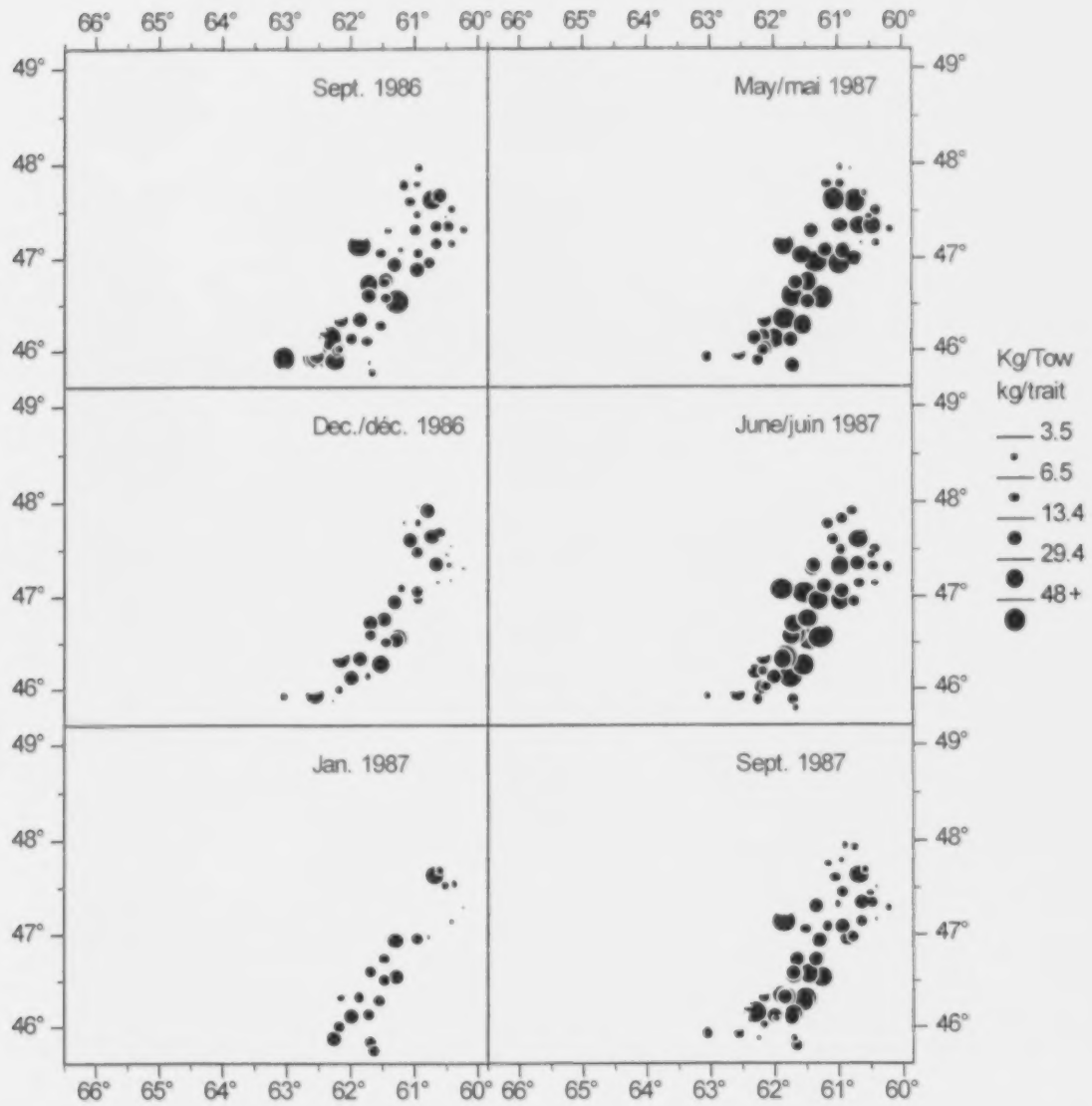

Figure 56a. S.E. Gulf of St. Lawrence seasonal distribution of catches (kg/tow) of unspecified marine invertebrates

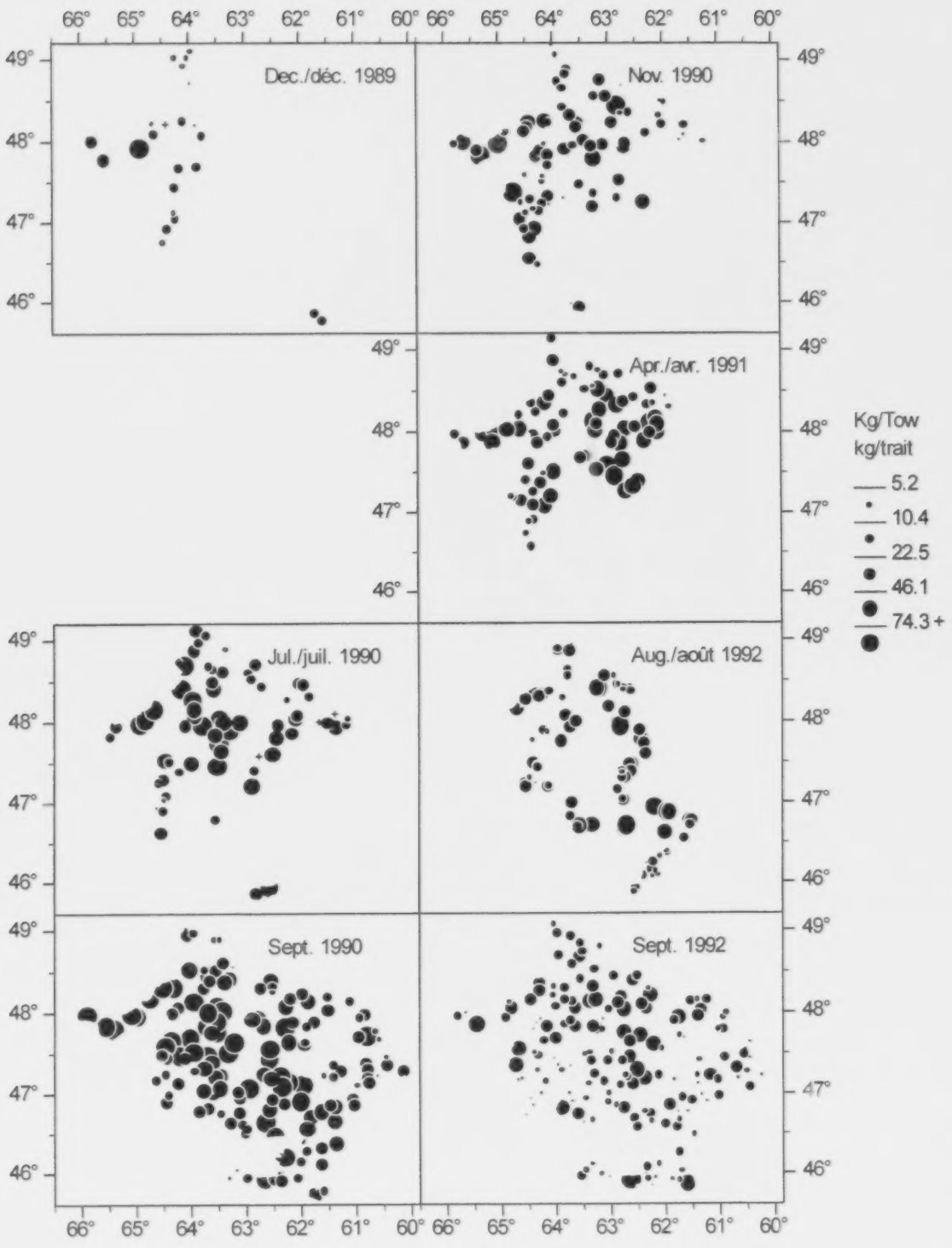

Figure 56b. S.W. Gulf of St. Lawrence seasonal distribution of catches (kg/tow) of unspecified marine invertebrates

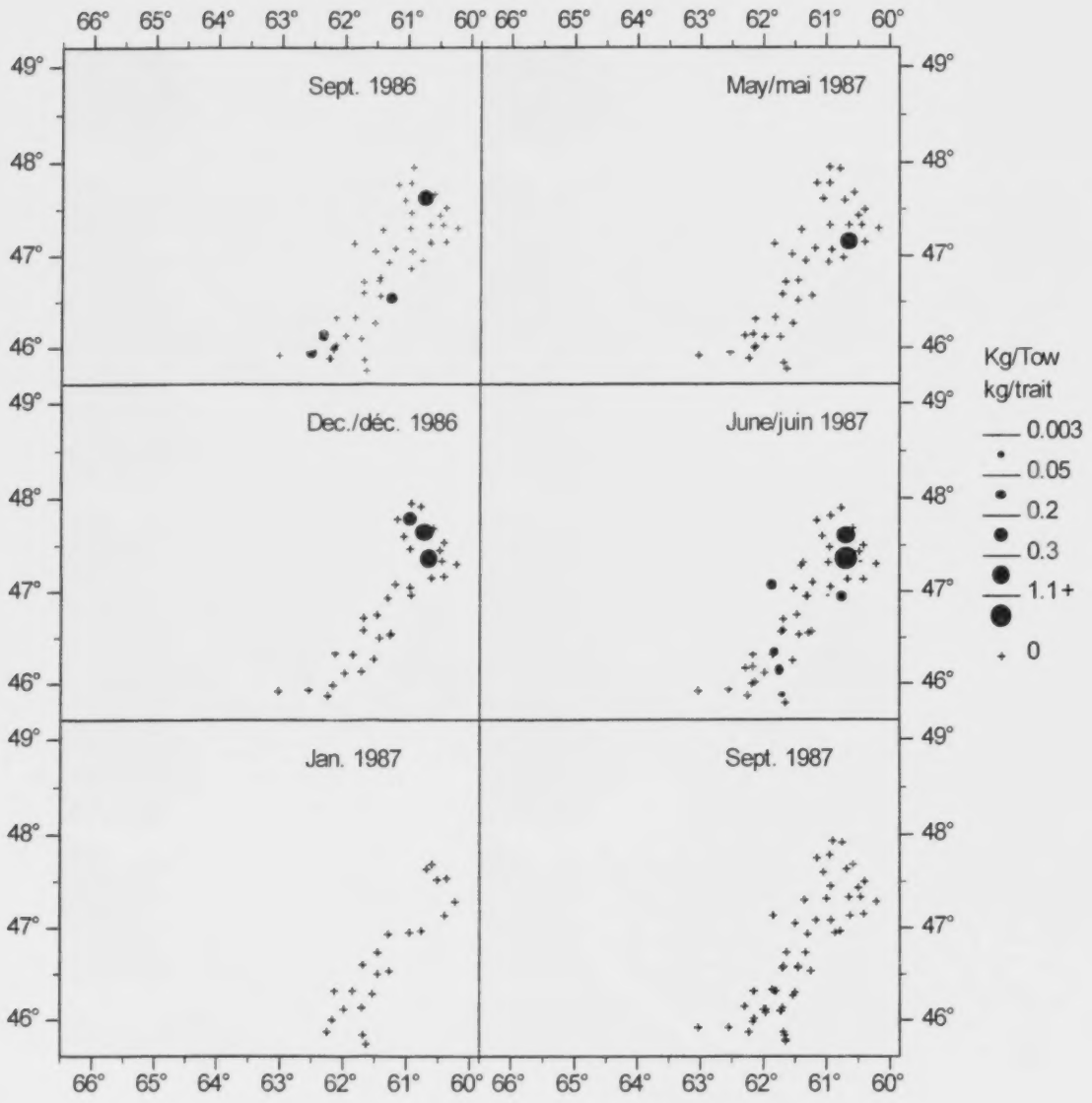

Figure 57a. S.E. Gulf of St. Lawrence seasonal distribution of catches (kg/tow) of Tunicates, Tunicata

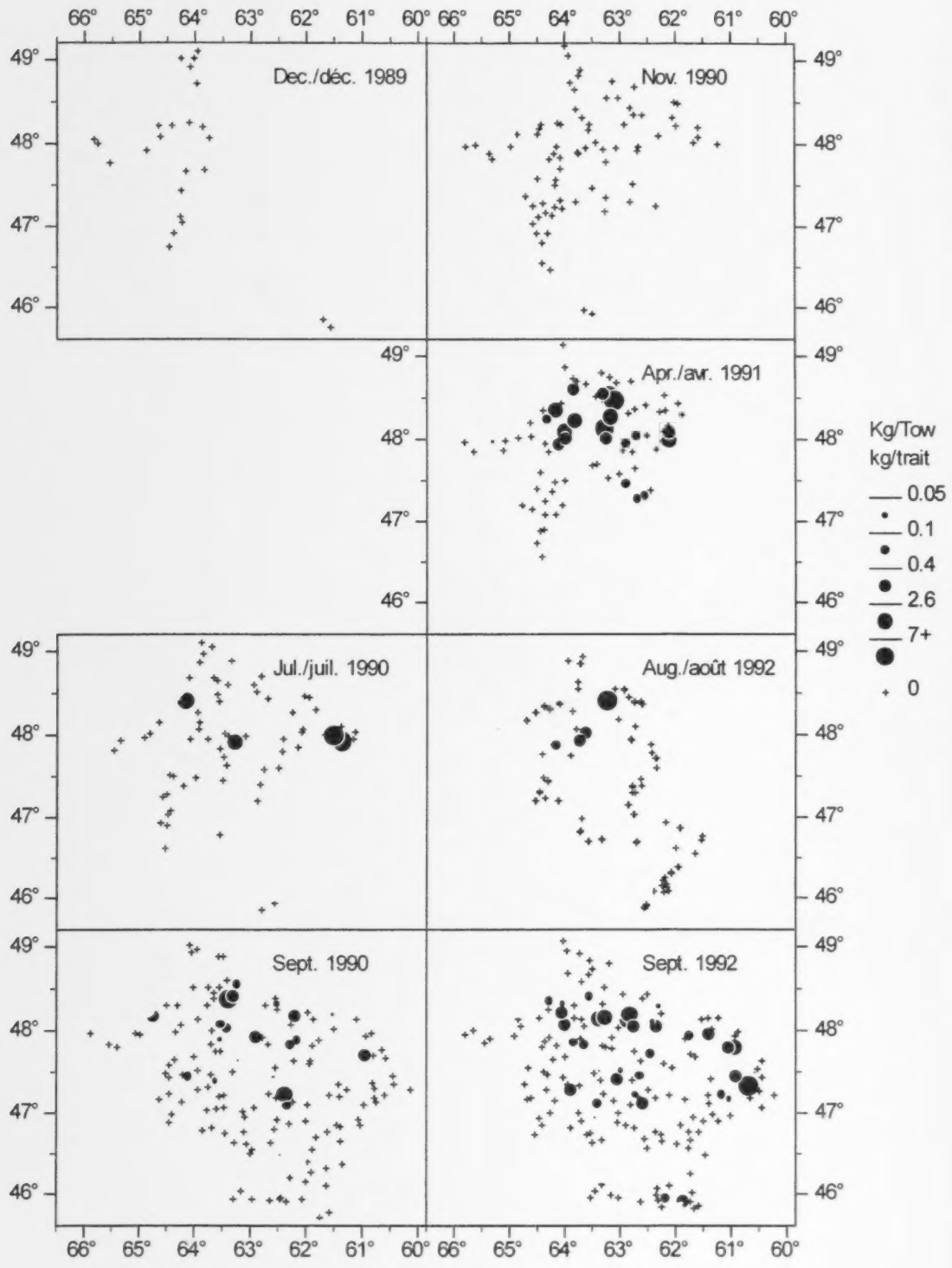

Figure 57b. S.W. Gulf of St. Lawrence seasonal distribution of catches (kg/tow) of Tunicates, Tunicata

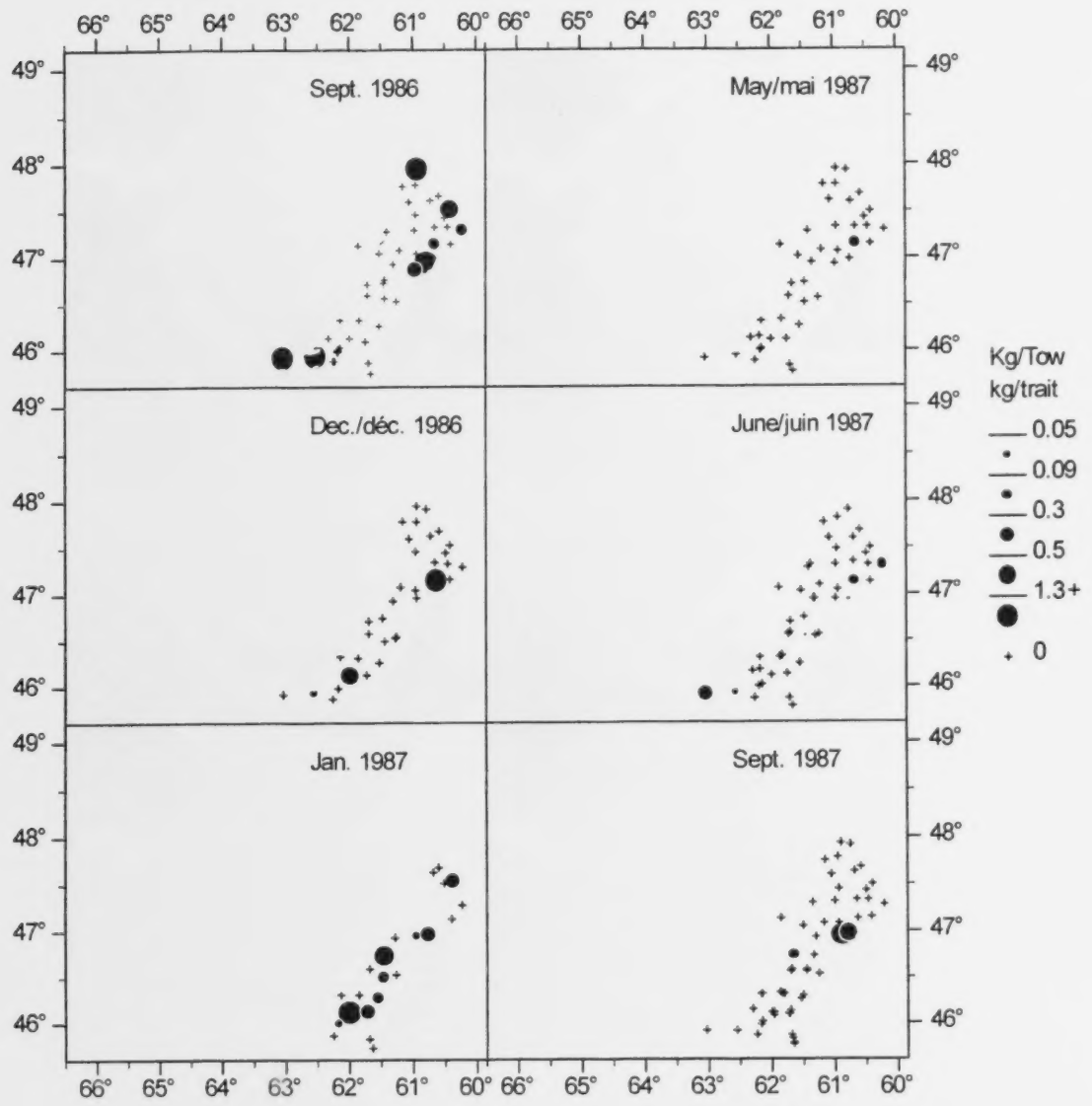

Figure 58a. S.E. Gulf of St. Lawrence seasonal distribution of catches (kg/tow) of Decapod Shrimp, Decapoda

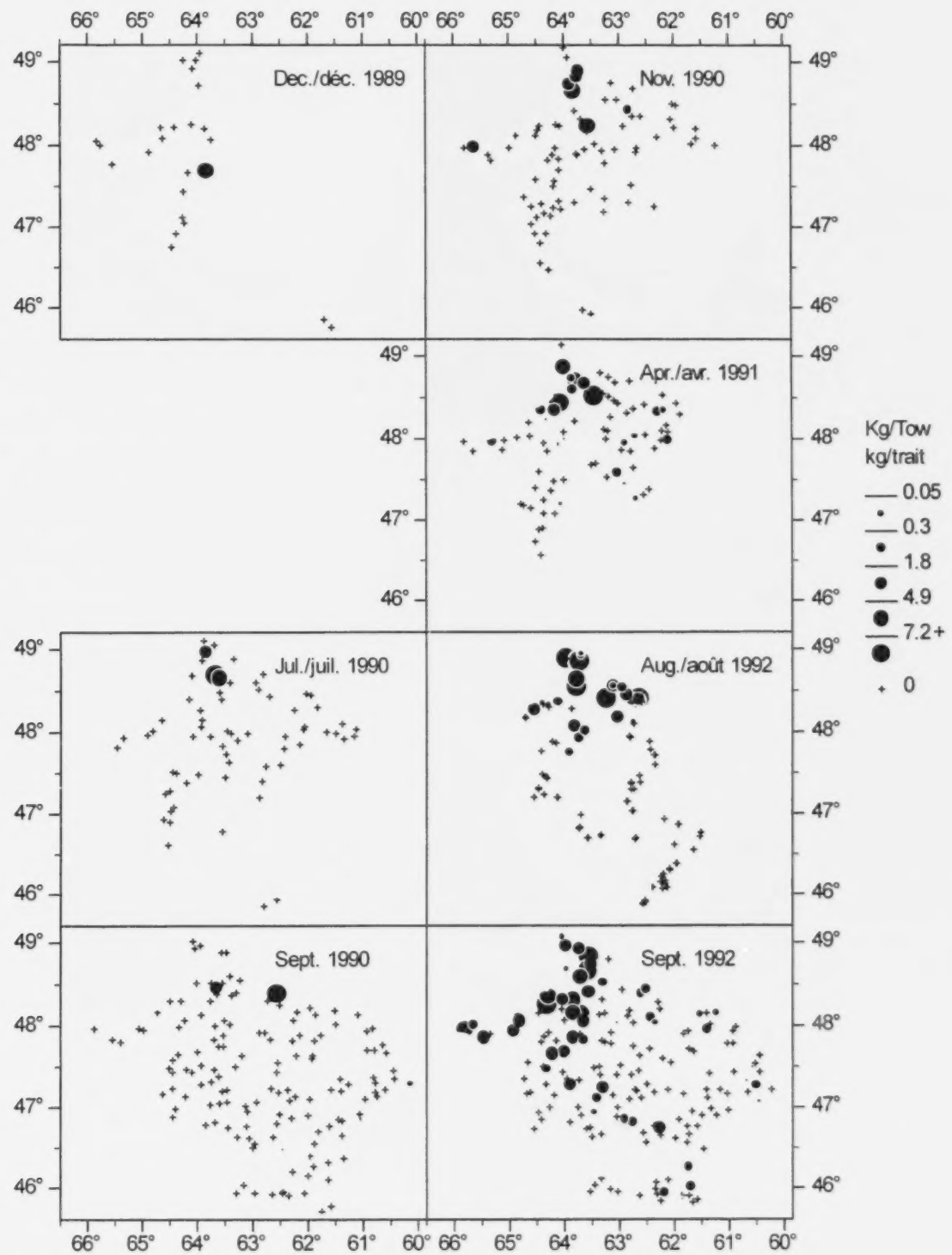

Figure 58b. S.W. Gulf of St. Lawrence seasonal distribution of catches (kg/tow) of Decapod Shrimp, Decapoda

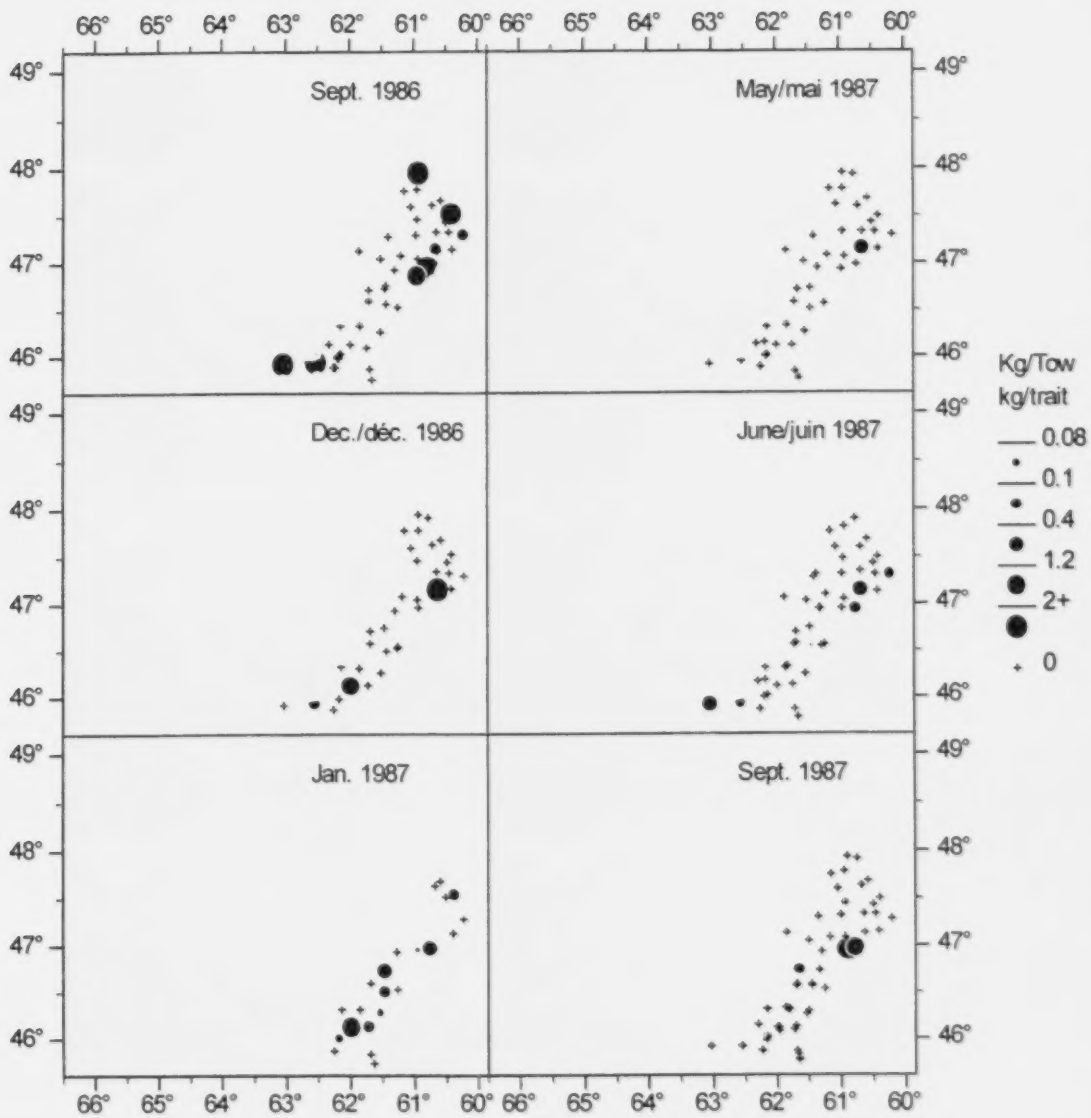

Figure 59a. S.E. Gulf of St. Lawrence seasonal distribution of catches (kg/tow) of Pandalid Shrimp, Pandalidae

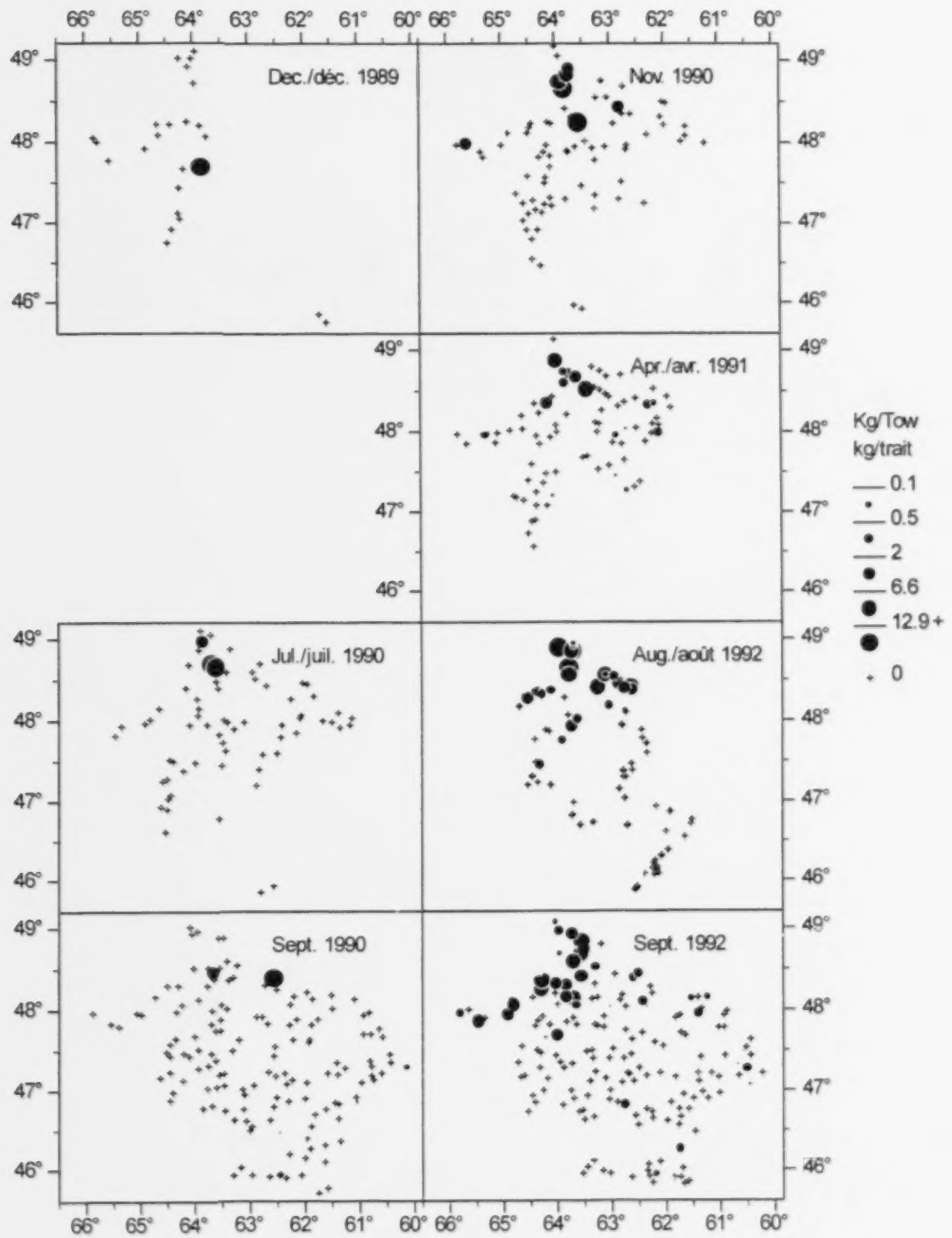

Figure 59b. S.W. Gulf of St. Lawrence seasonal distribution of catches (kg/tow) of Pandalid Shrimp, Pandalidae

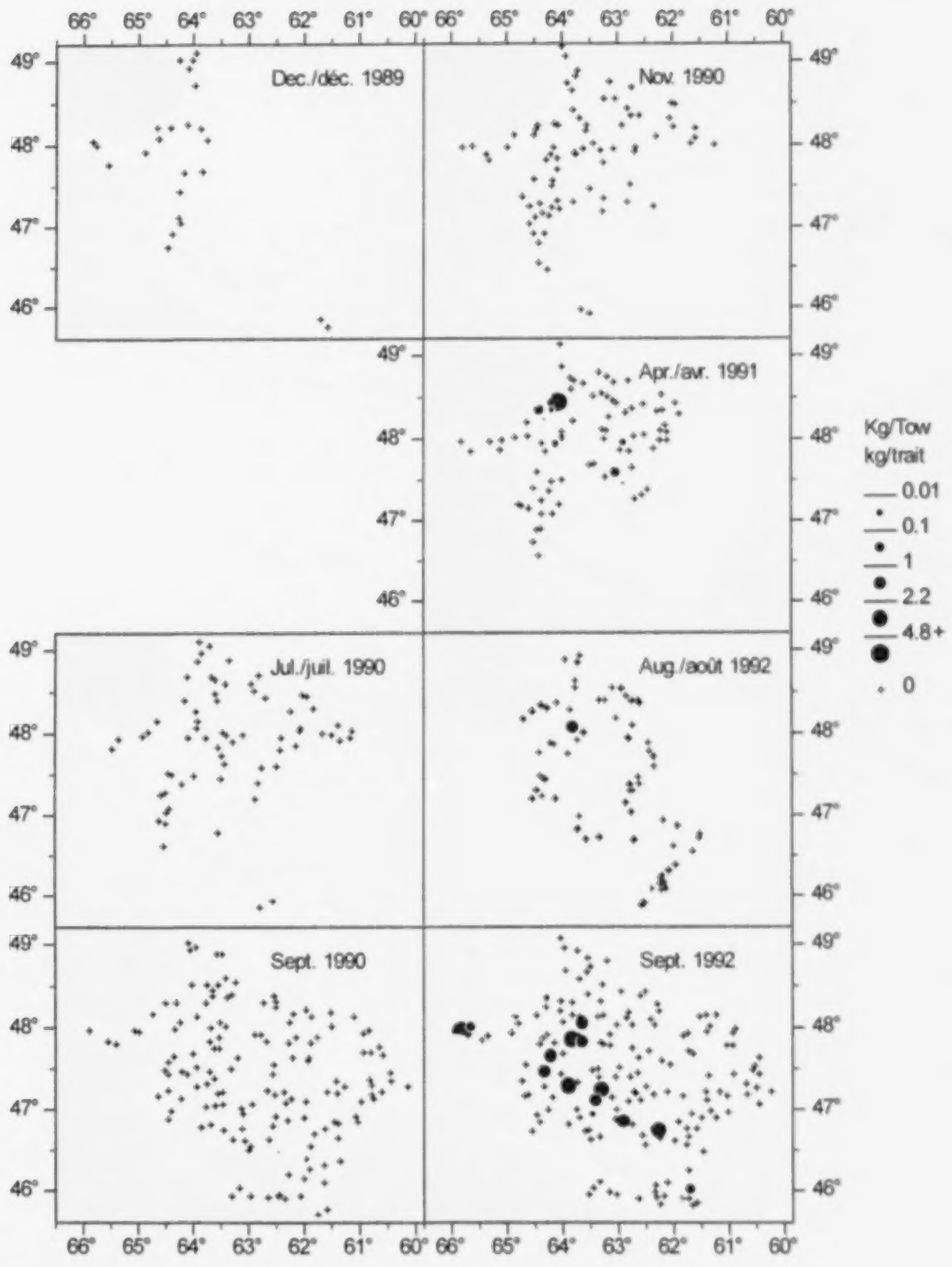

Figure 60. S.W. Gulf of St. Lawrence seasonal distribution of catches (kg/tow) of Snapping Shrimp, Crangonidae

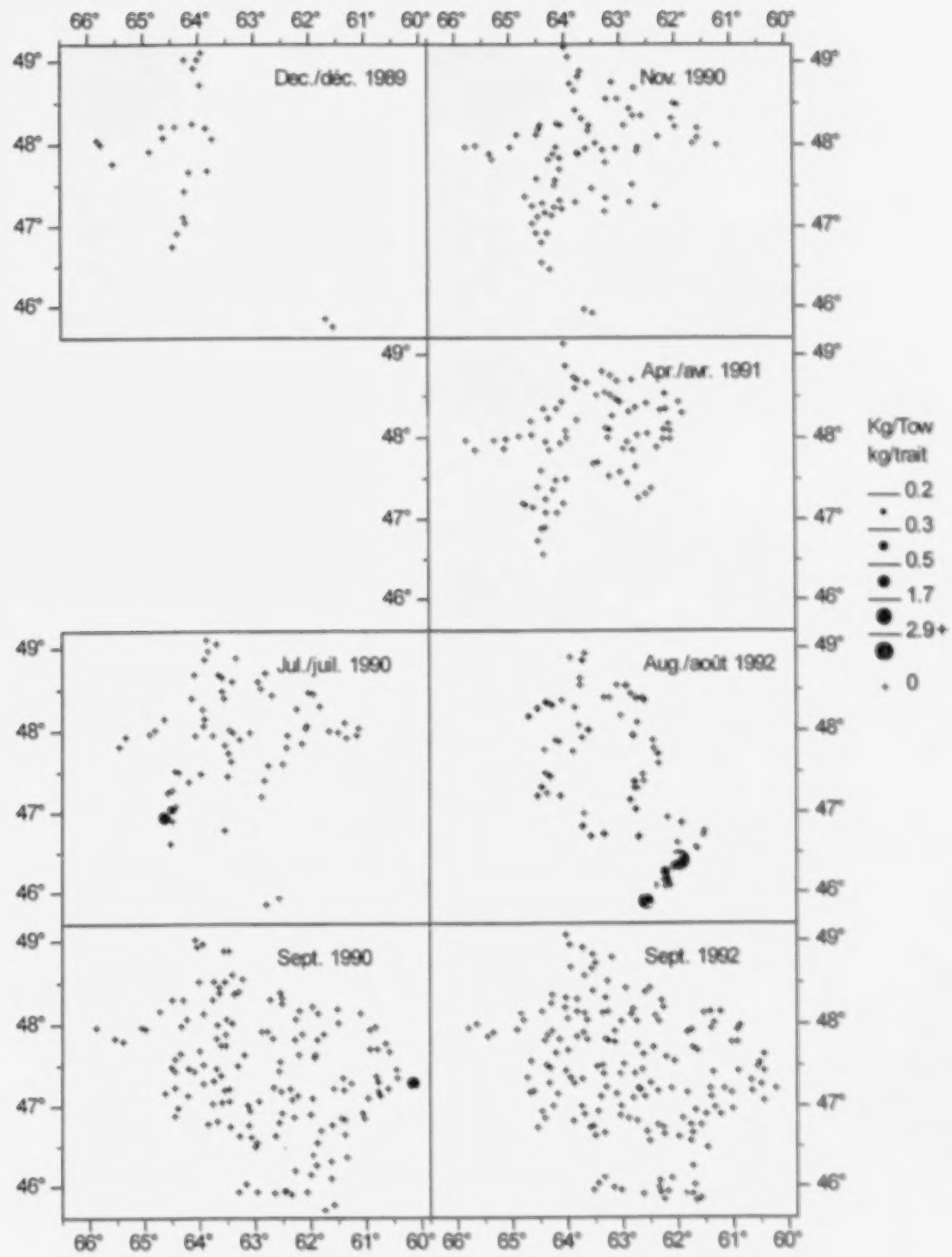

Figure 61. S.W. Gulf of St. Lawrence seasonal distribution of catches (kg/tow) of Jonah Crab, *Cancer borealis*

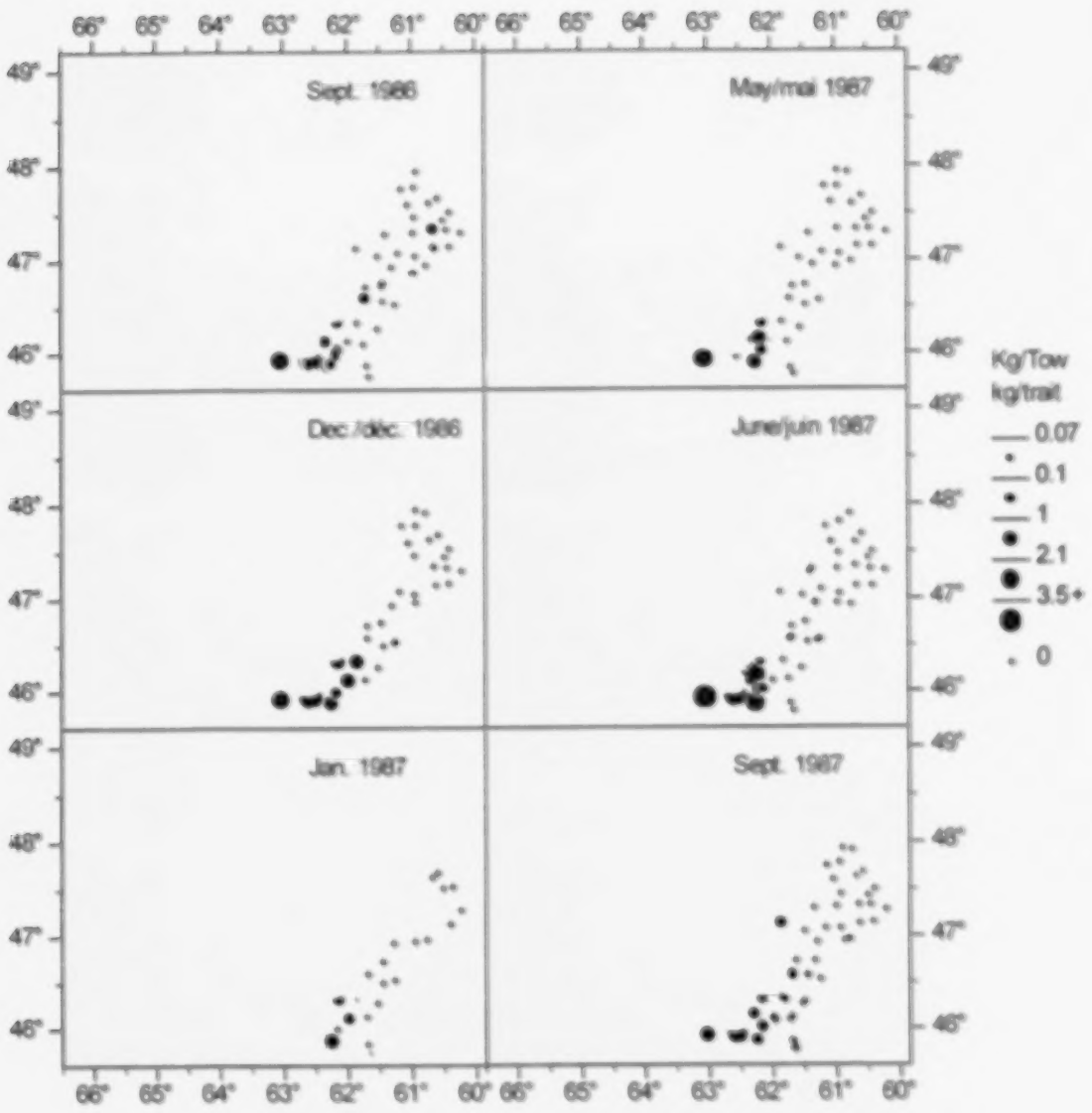

Figure 62a. S.E. Gulf of St. Lawrence seasonal distribution of catches (kg/tow) of Atlantic Rock Crab, *Cancer irroratus*

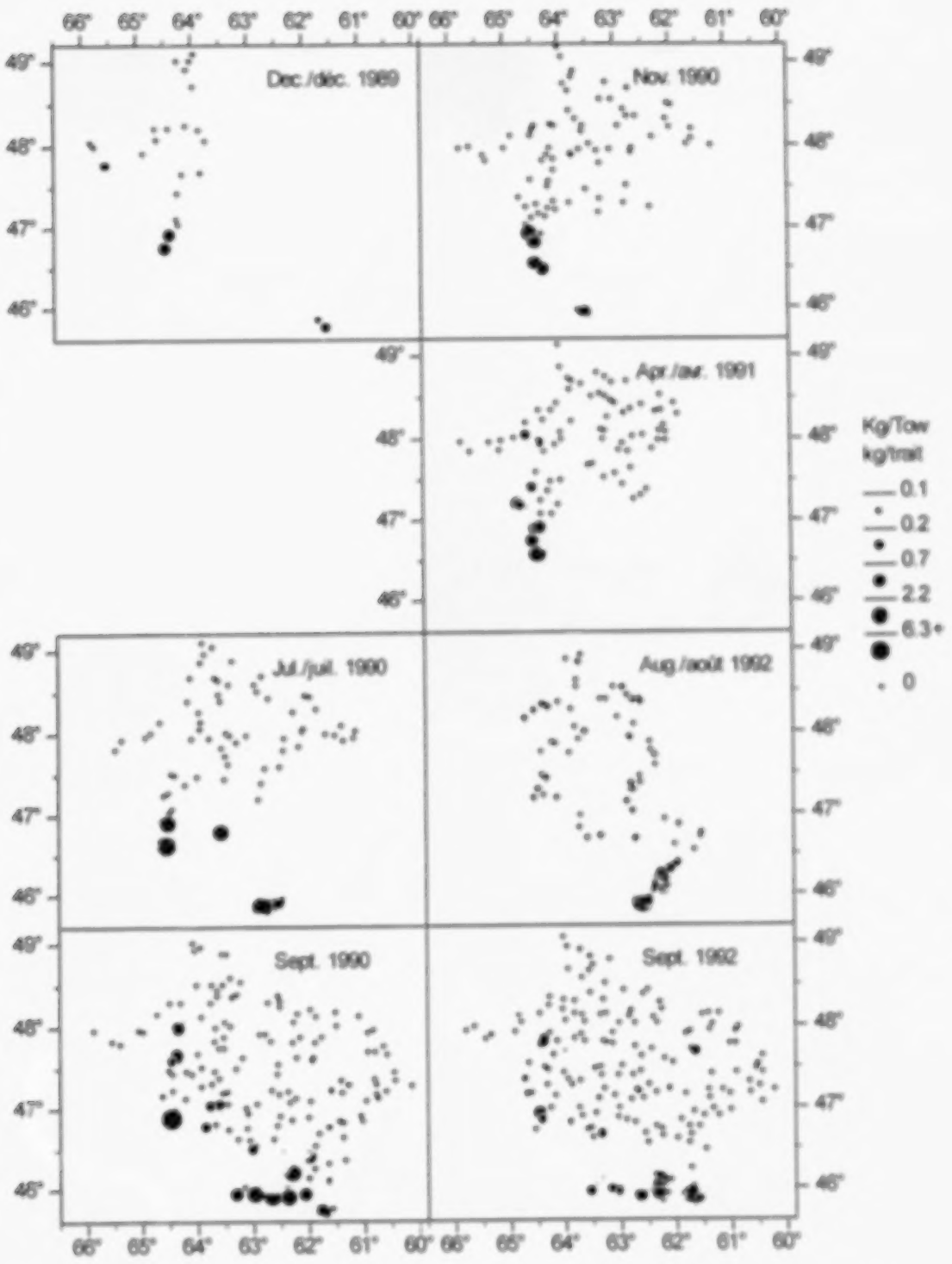

Figure 62b. S.W. Gulf of St. Lawrence seasonal distribution of catches (kg/tow) of Atlantic Rock Crab, *Cancer irroratus*

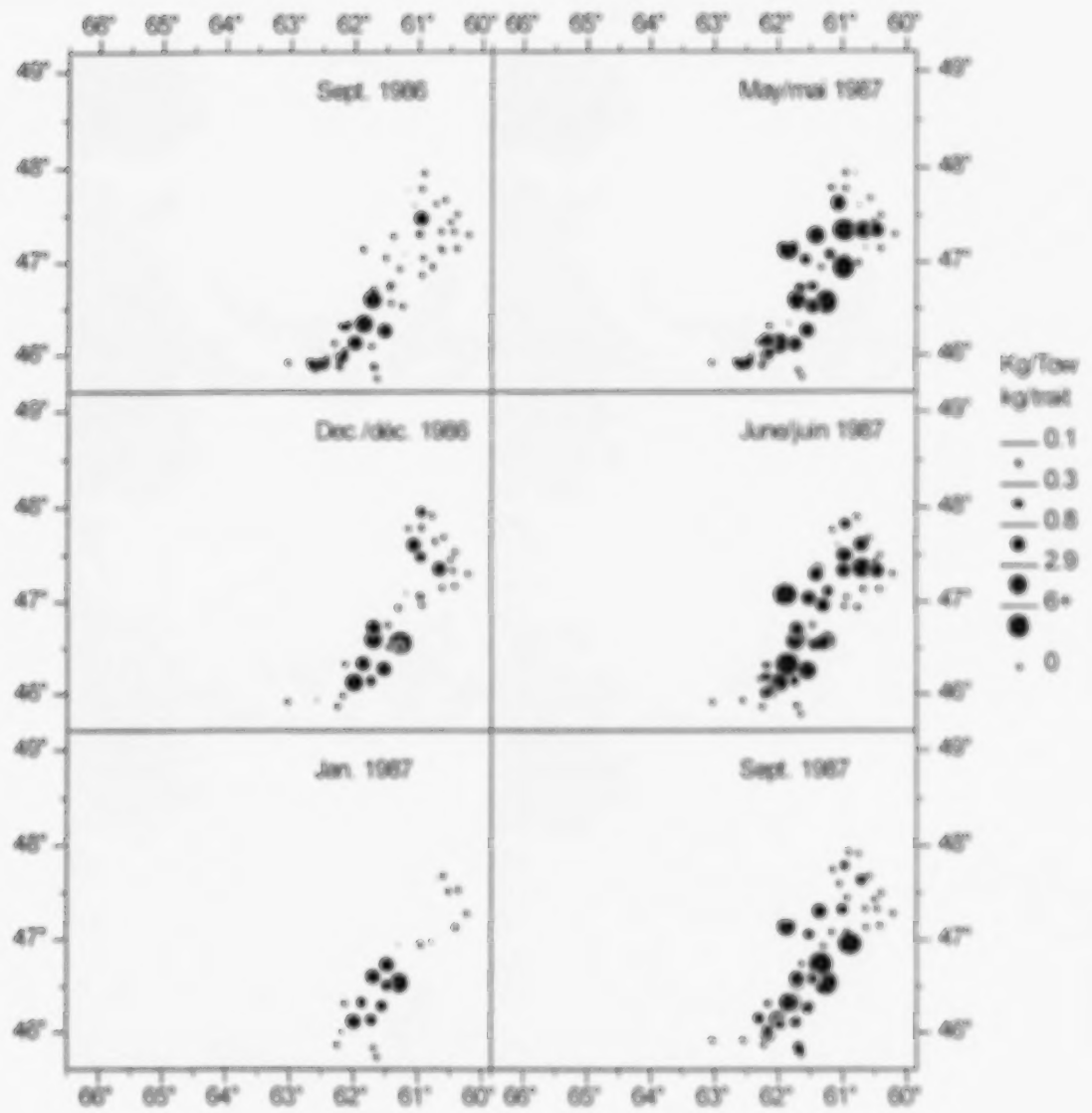

Figure 63a. S.E. Gulf of St. Lawrence seasonal distribution of catches (kg/tow) of Toad Crabs, Hyas sp.

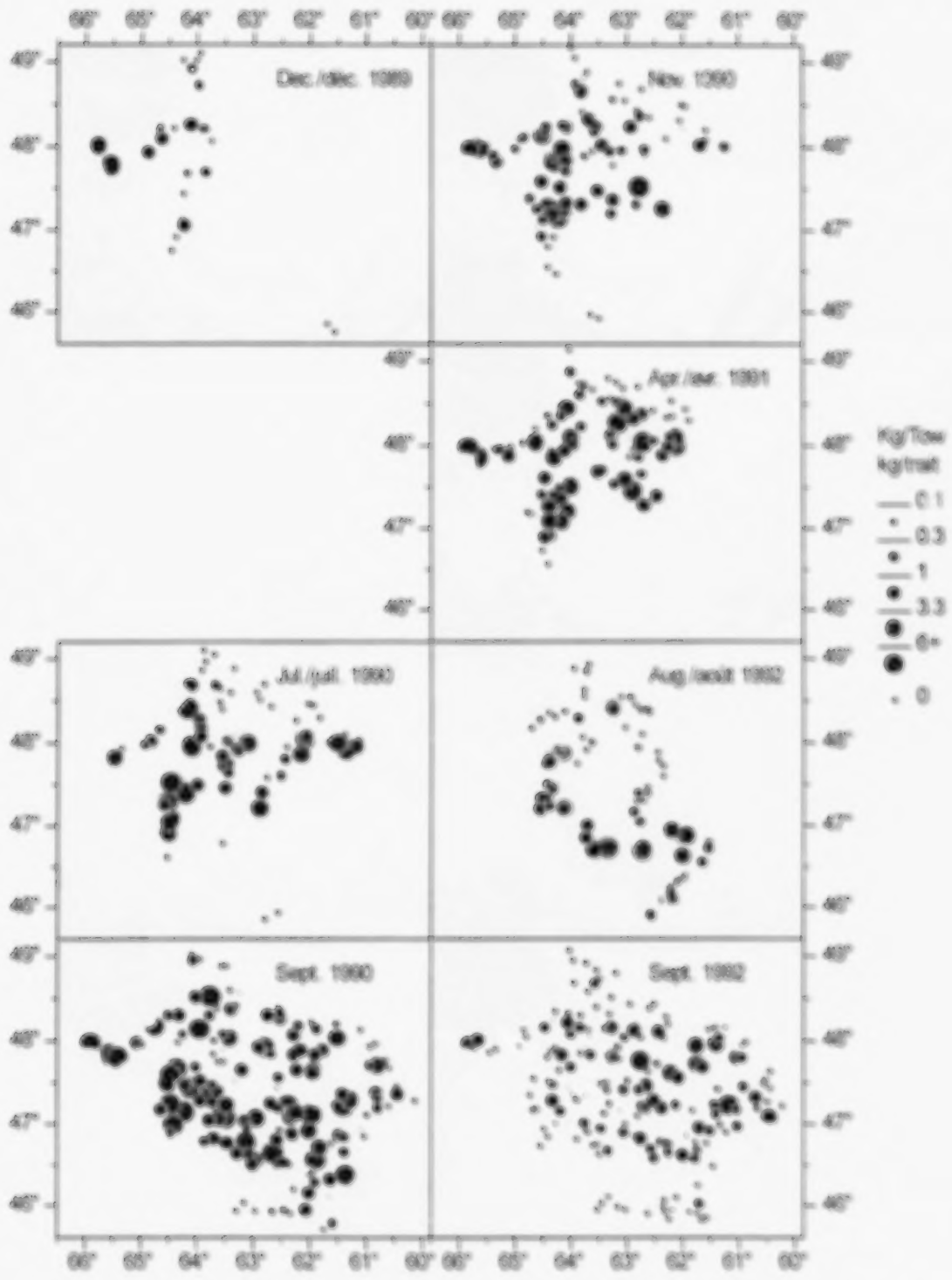

Figure 63b. S.W. Gulf of St. Lawrence seasonal distribution of catches (kg/tow) of Toad Crabs, *Hyas* sp.

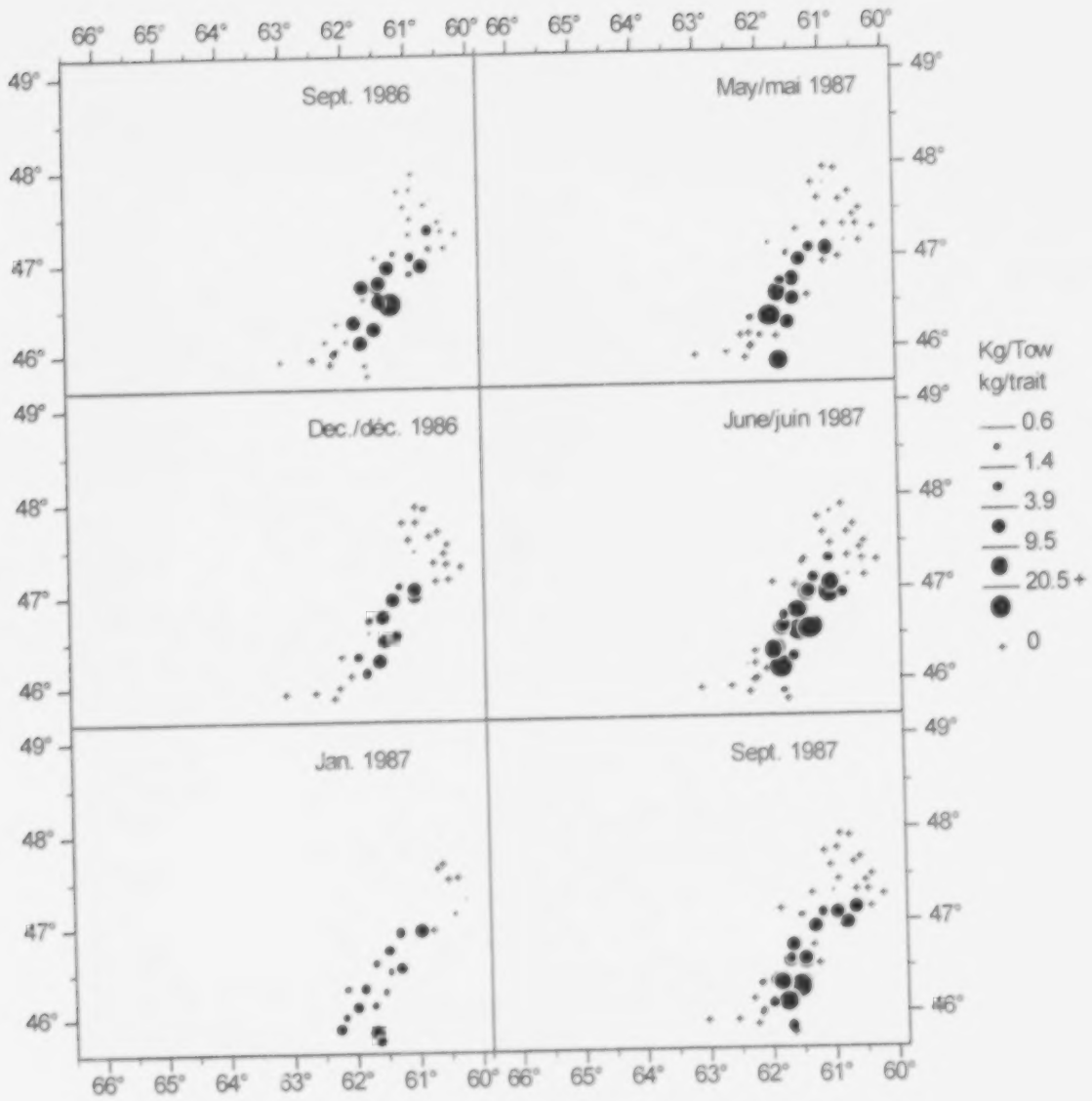

Figure 64a. S.E. Gulf of St. Lawrence seasonal distribution of catches (kg/tow) of Snow Crab, *Chionoectes opilio*

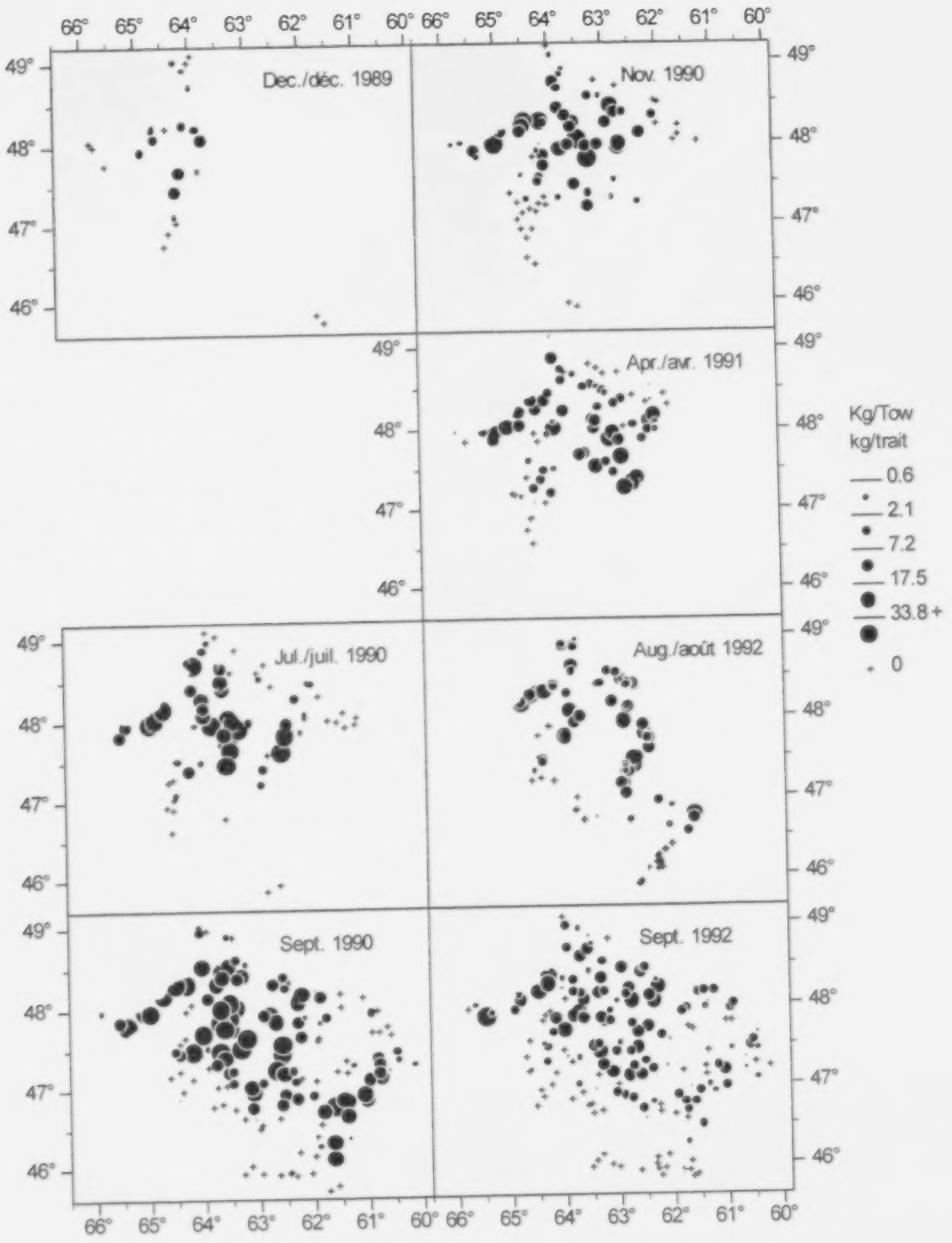

Figure 64b. S.W. Gulf of St. Lawrence seasonal distribution of catches (kg/tow) of Snow Crab, *Chionoectes opilio*

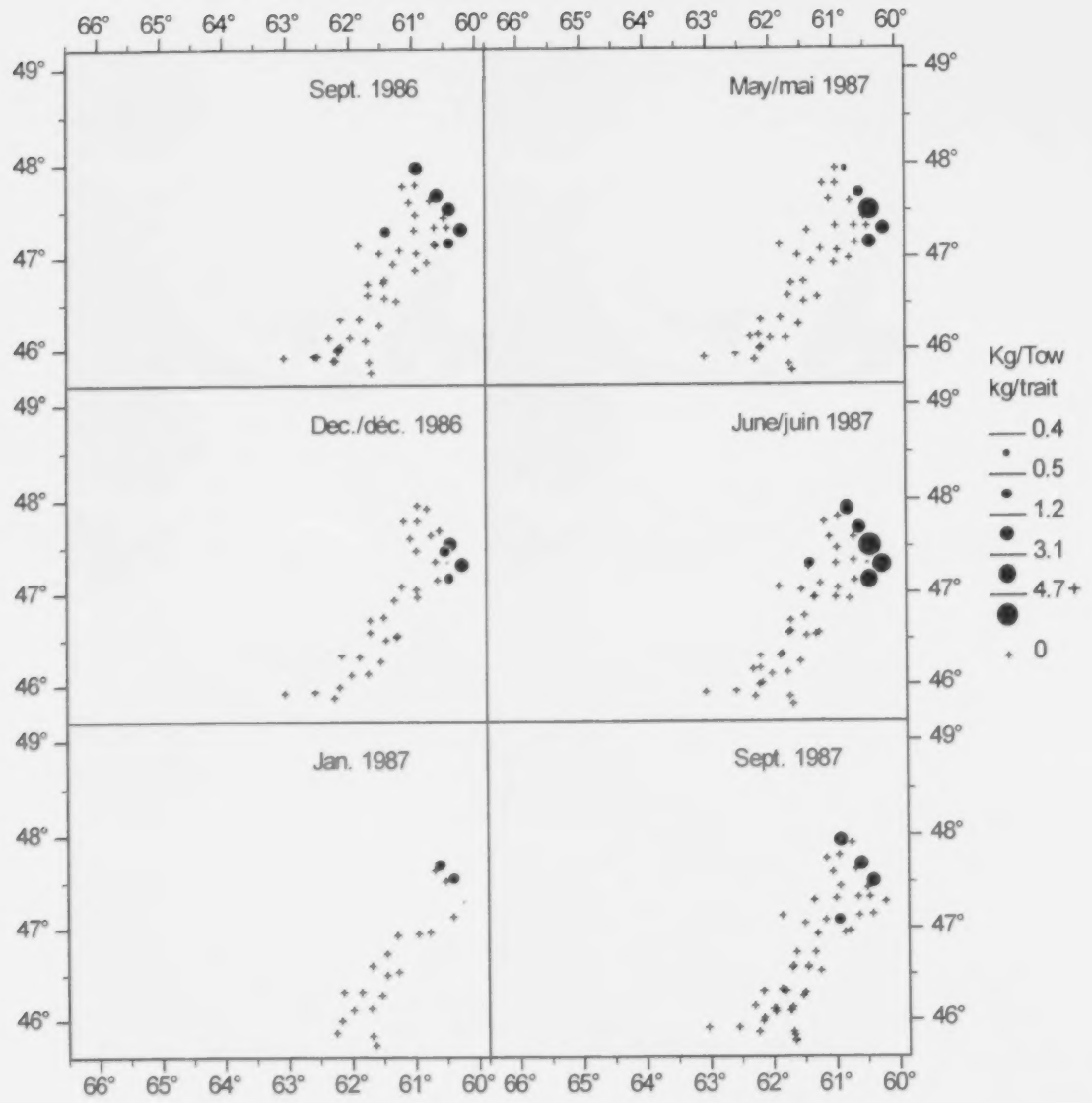

Figure 65a. S.E. Gulf of St. Lawrence seasonal distribution of catches (kg/tow) of Northern Stone Crab, *Lithodes maja*

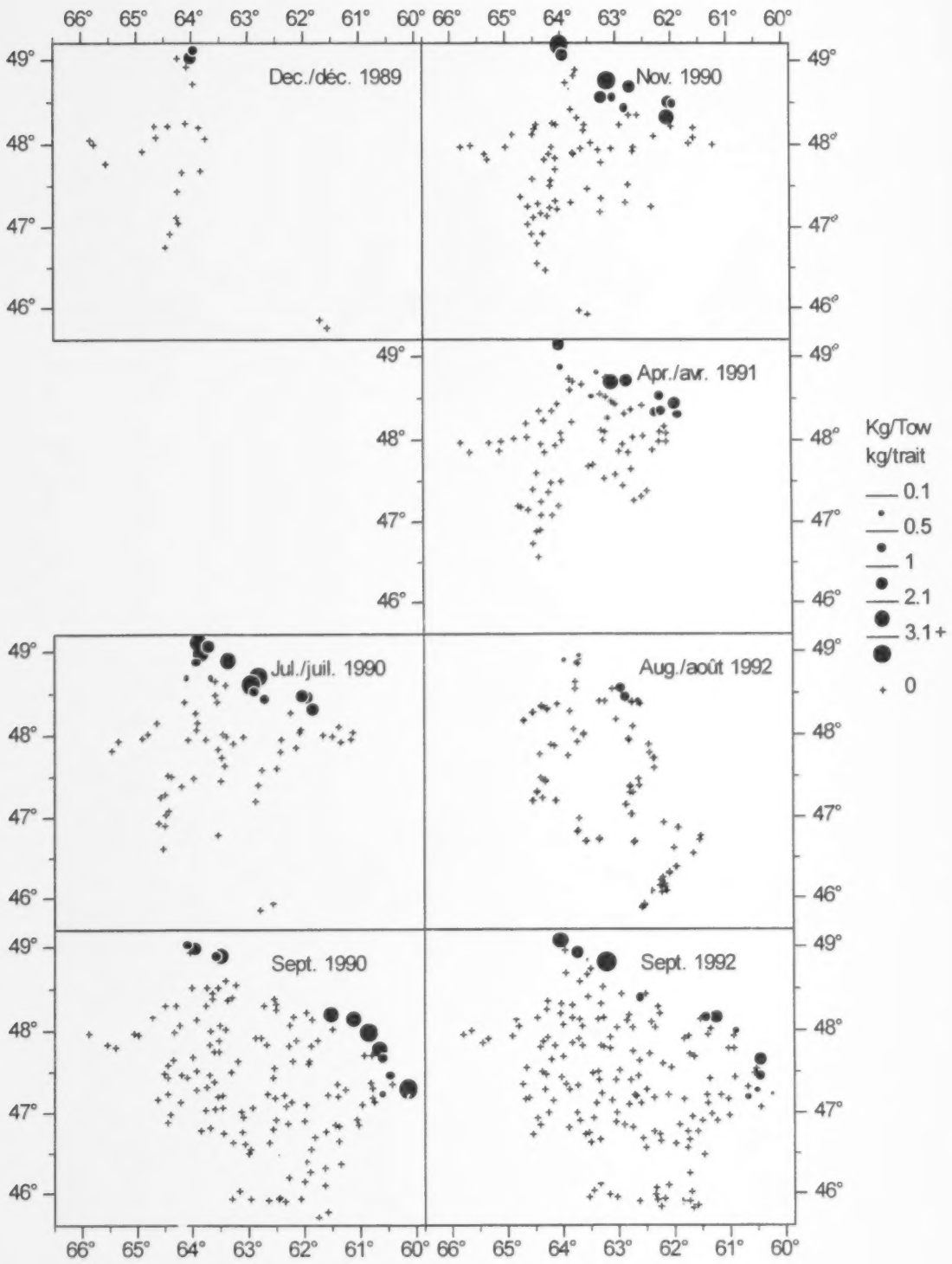

Figure 65b. S.W. Gulf of St. Lawrence seasonal distribution of catches (kg/tow) of Northern Stone Crab, *Lithodes maja*

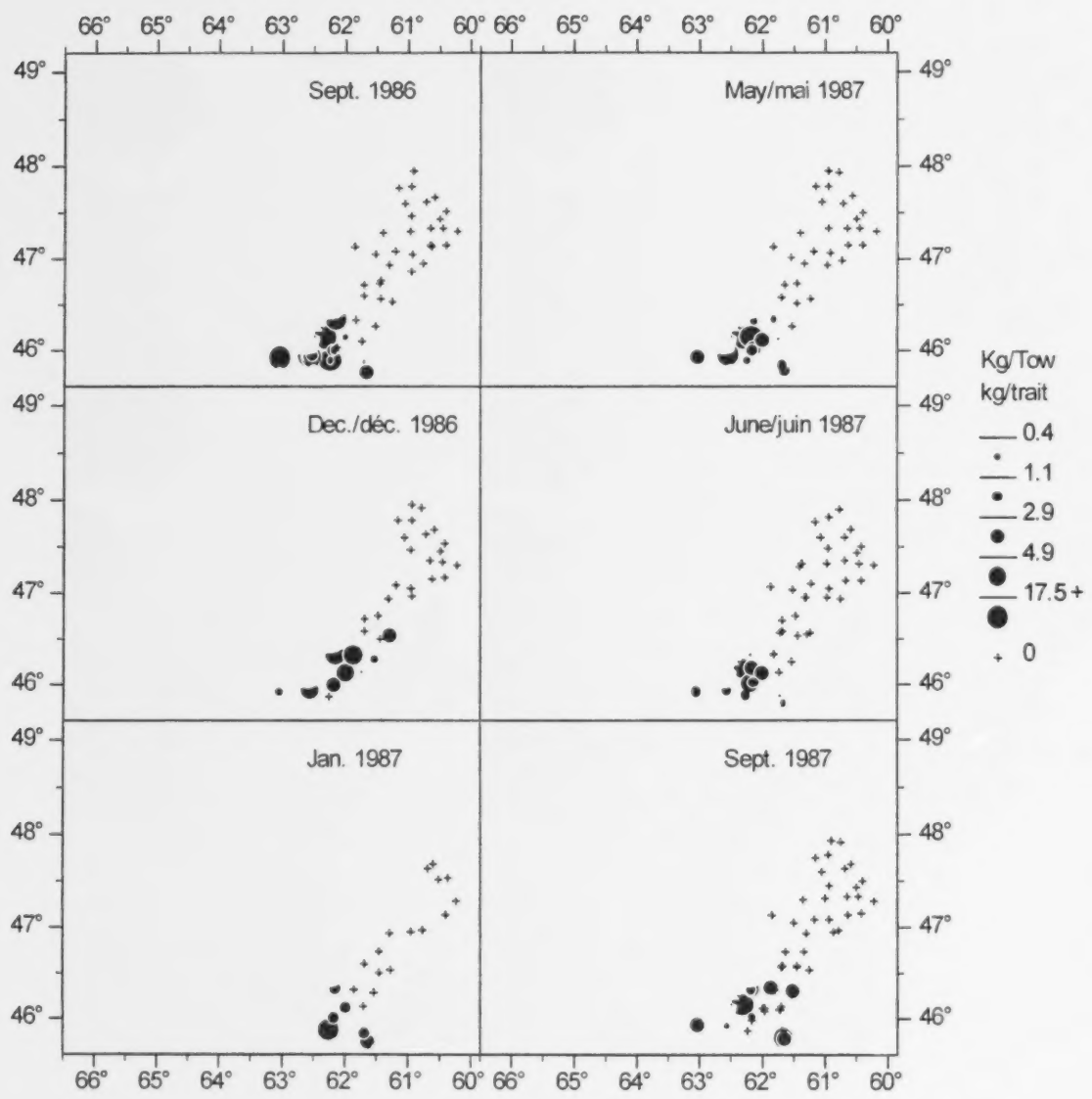

Figure 66a. S.E. Gulf of St. Lawrence seasonal distribution of catches (kg/tow) of Lobster, *Homarus americanus*

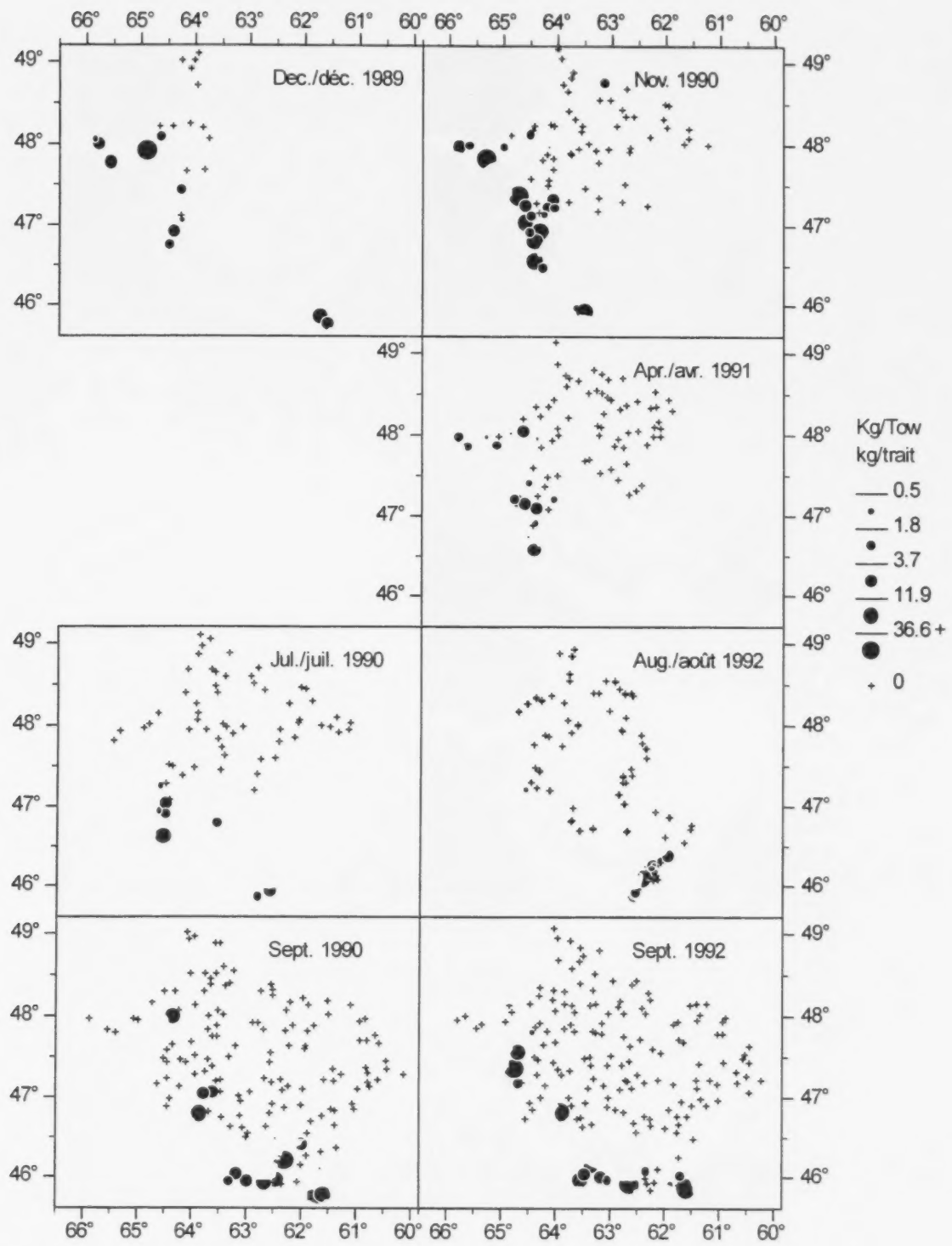

Figure 66b. S.W. Gulf of St. Lawrence seasonal distribution of catches (kg/tow) of Lobster, *Homarus americanus*

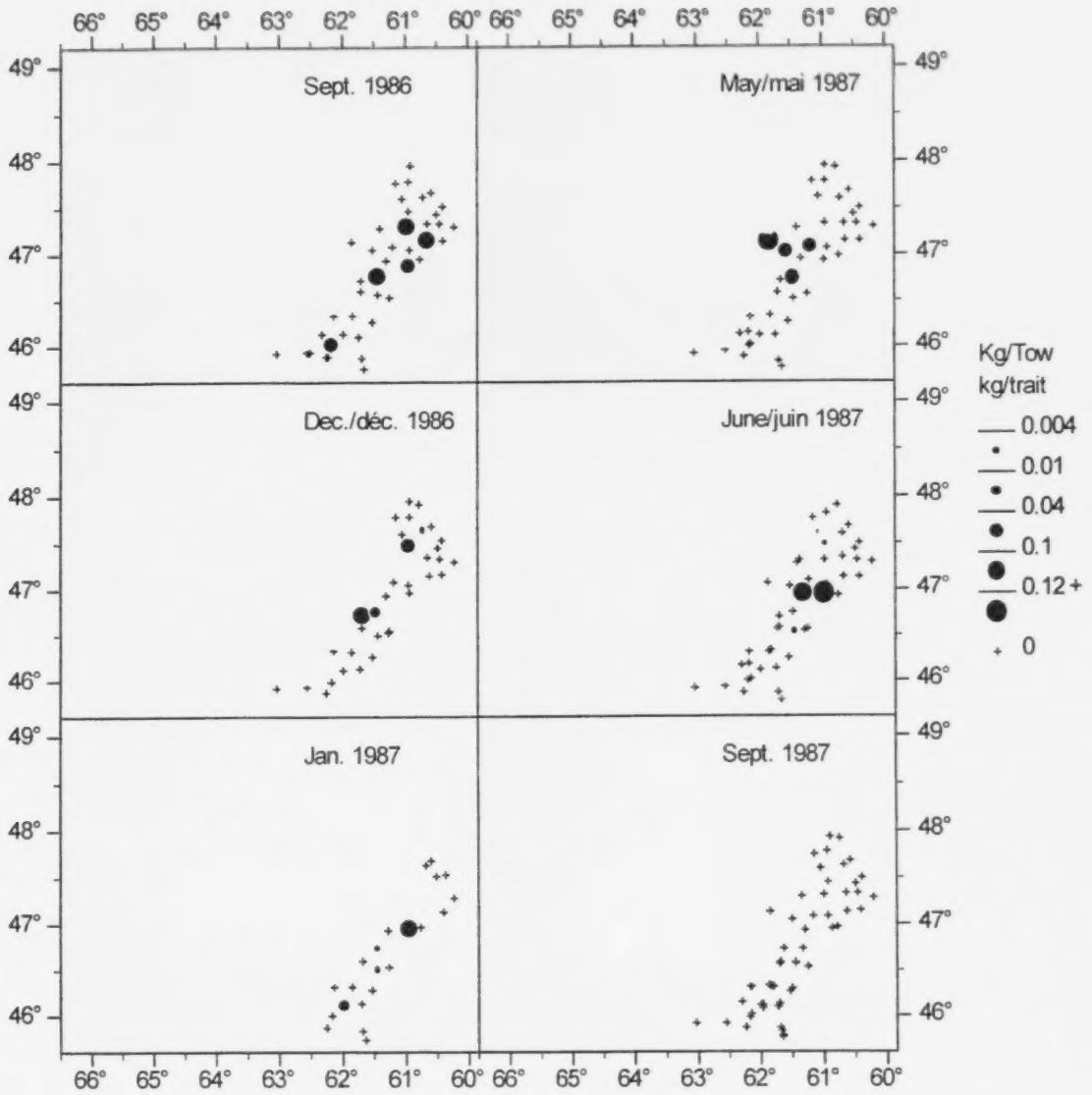

Figure 67a. S.E. Gulf of St. Lawrence seasonal distribution of catches (kg/tow) of Hermit Crabs, Paguroidae

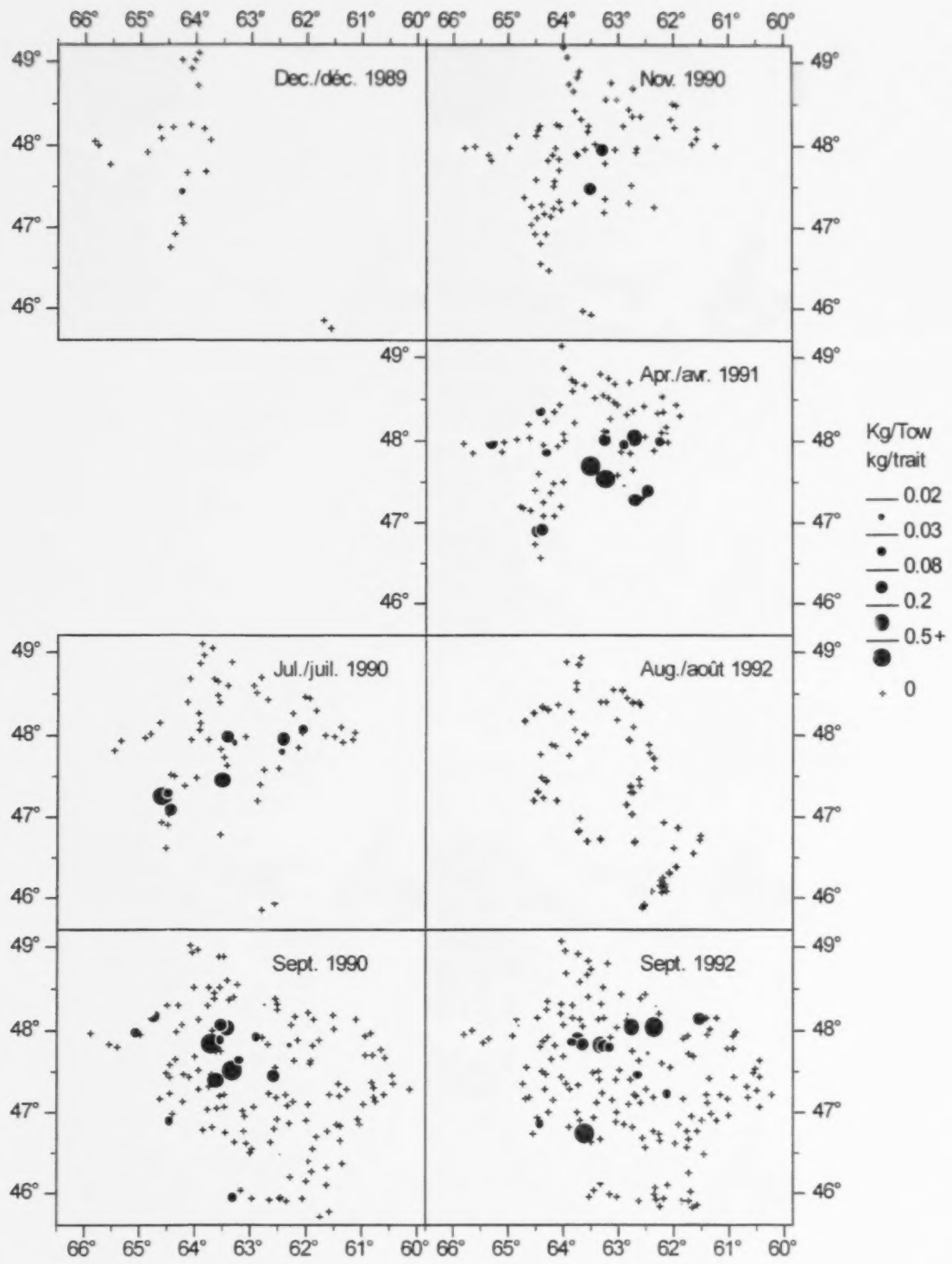

Figure 67b. S.W. Gulf of St. Lawrence seasonal distribution of catches (kg/tow) of Hermit Crabs, Paguroidae

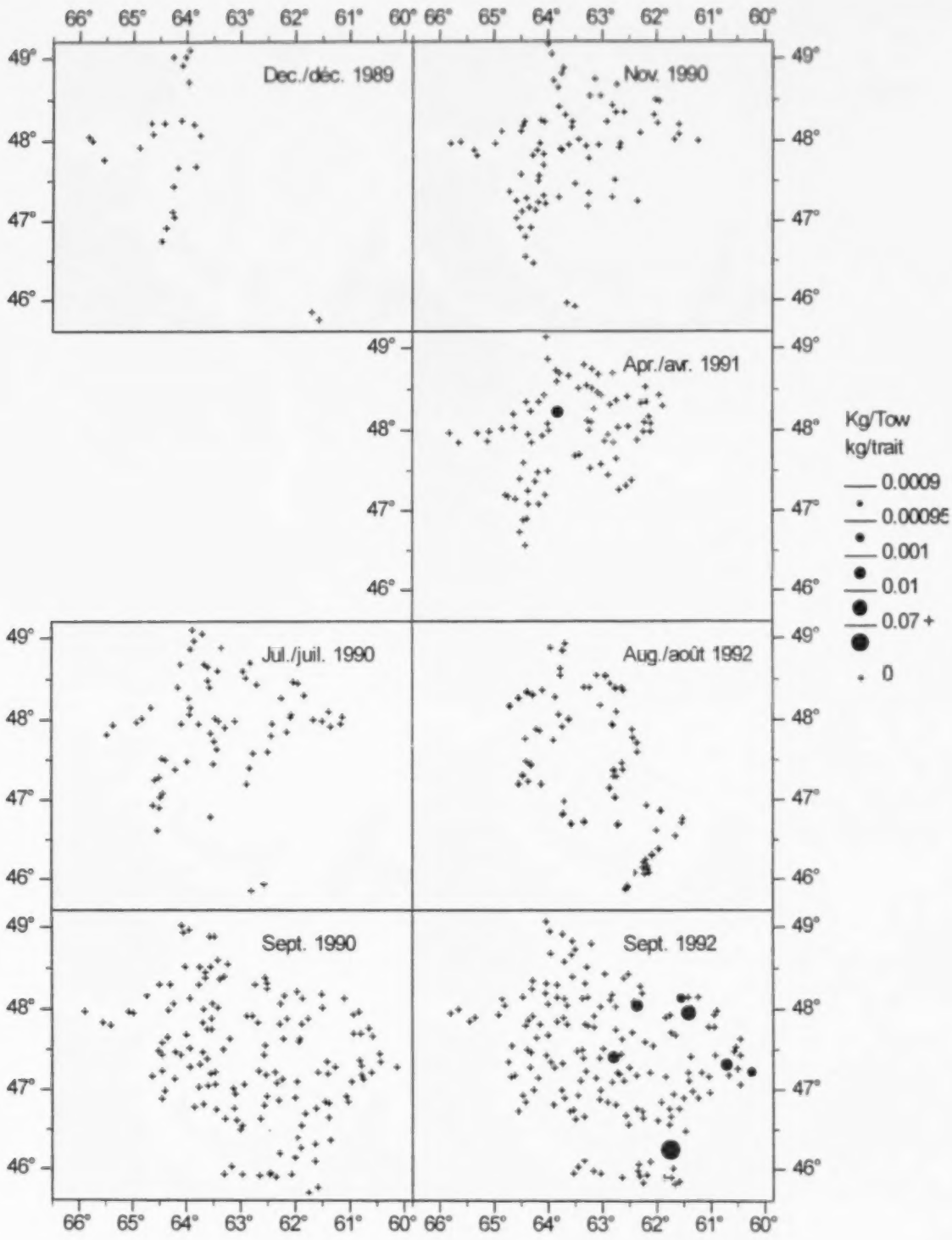

Figure 68. S.W. Gulf of St. Lawrence seasonal distribution of catches (kg/tow) of Bristle Worms, Polycheata

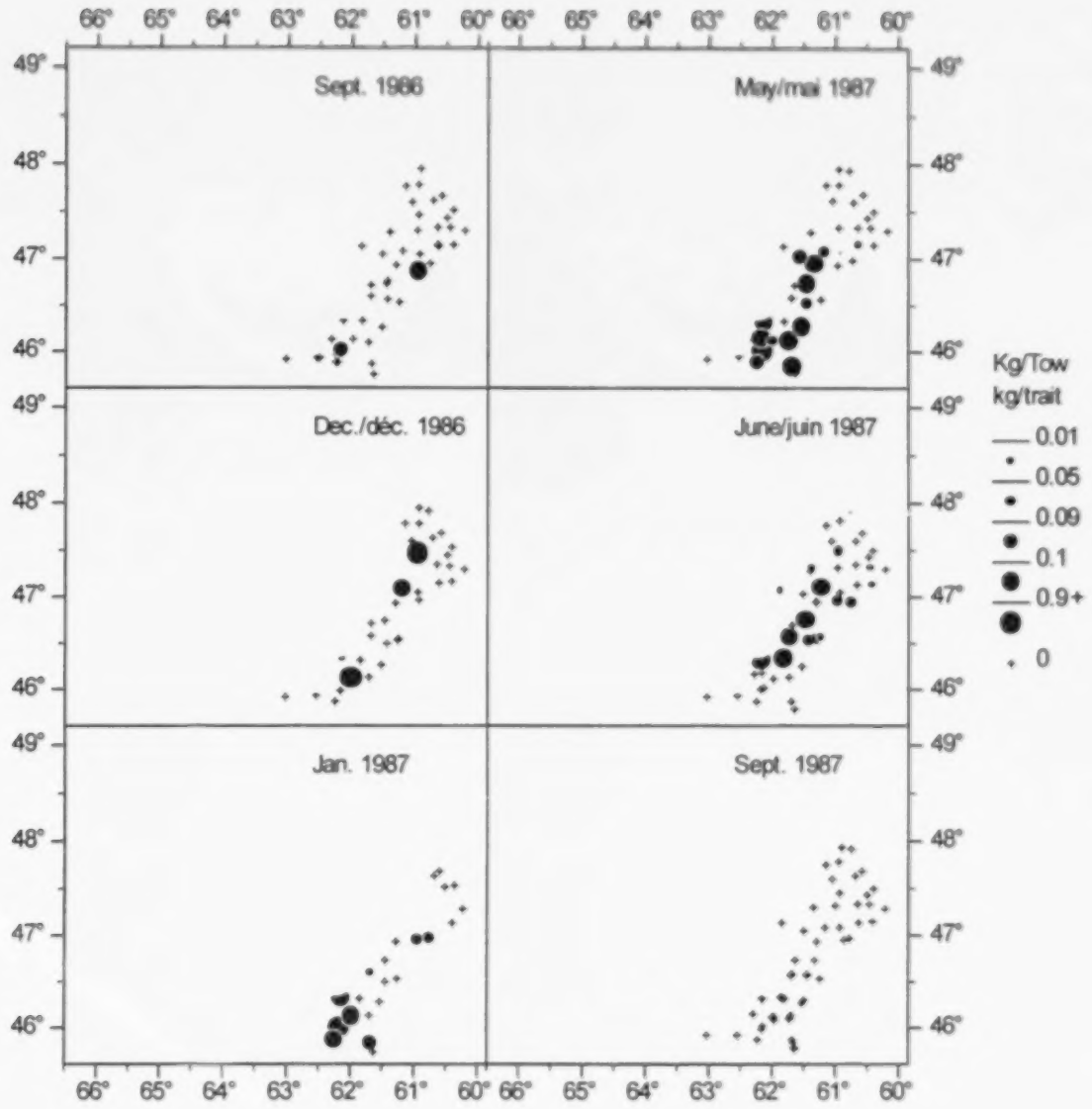

Figure 69a. S.E. Gulf of St. Lawrence seasonal distribution of catches (kg/tow) of Sea Mice, *Aphrodita sp.*

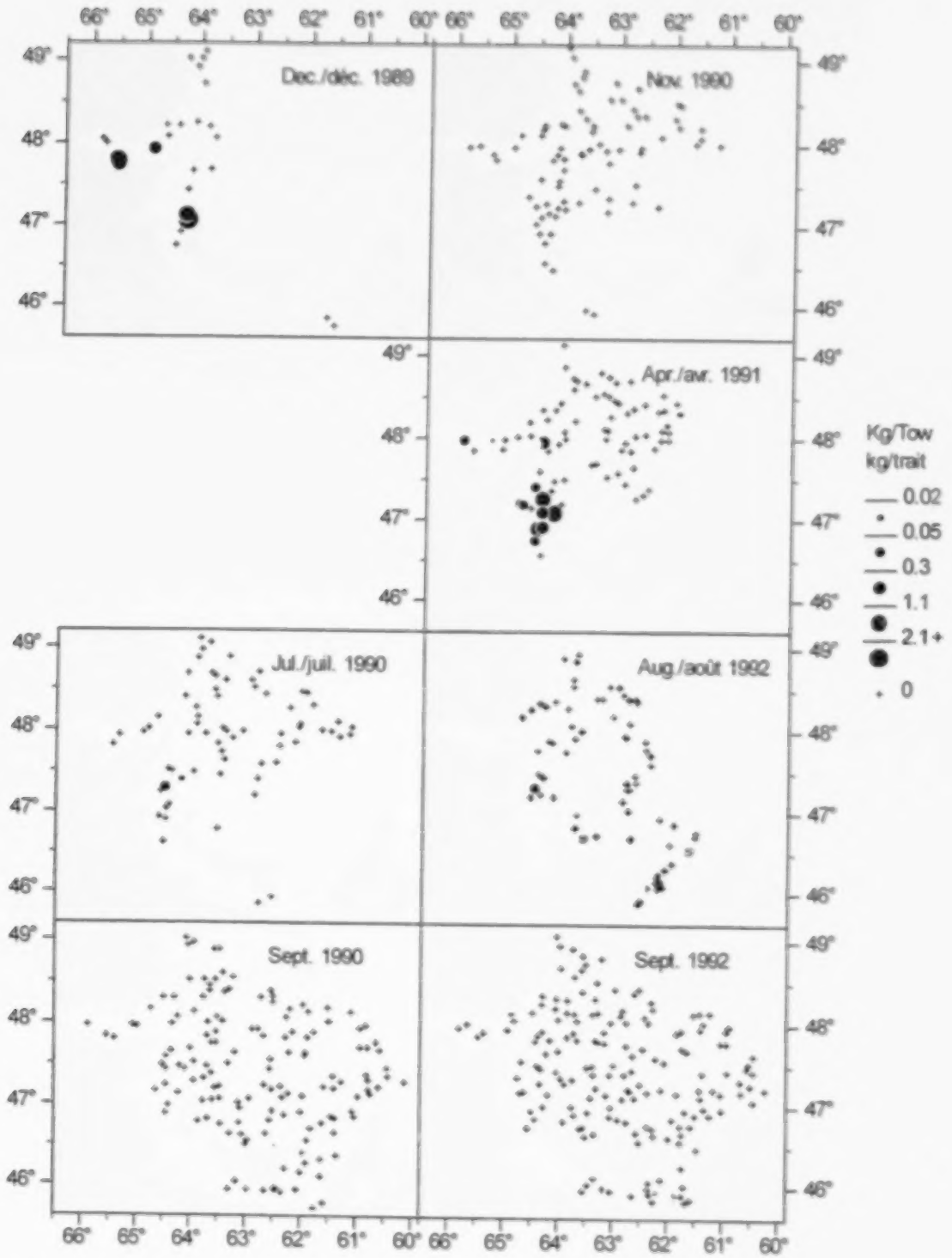

Figure 69b. S.W. Gulf of St. Lawrence seasonal distribution of catches (kg/tow) of Sea Mice, *Aphrodita sp.*

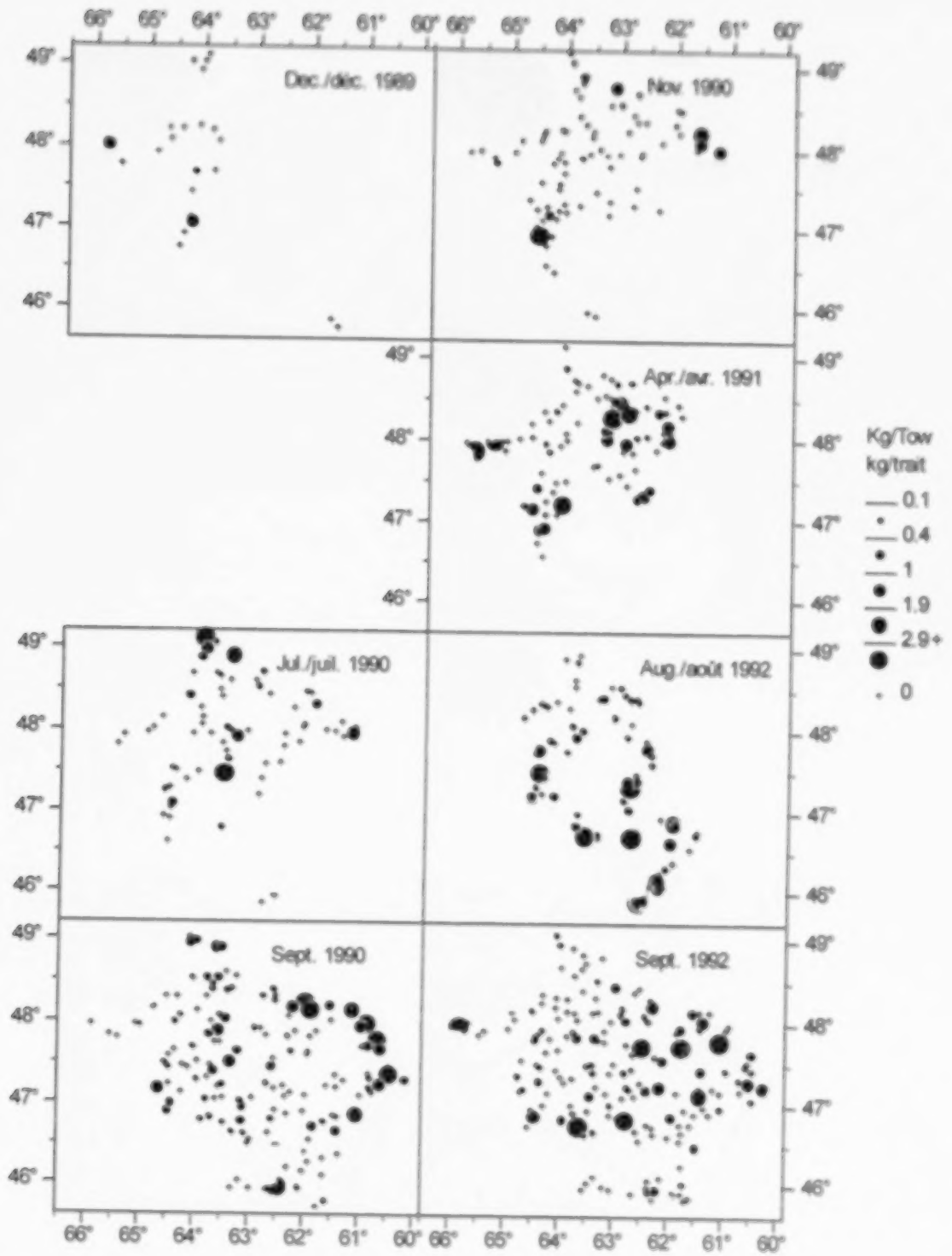

Figure 70. S.W. Gulf of St. Lawrence seasonal distribution of catches (kg/tow) of Molluscs, Mollusca

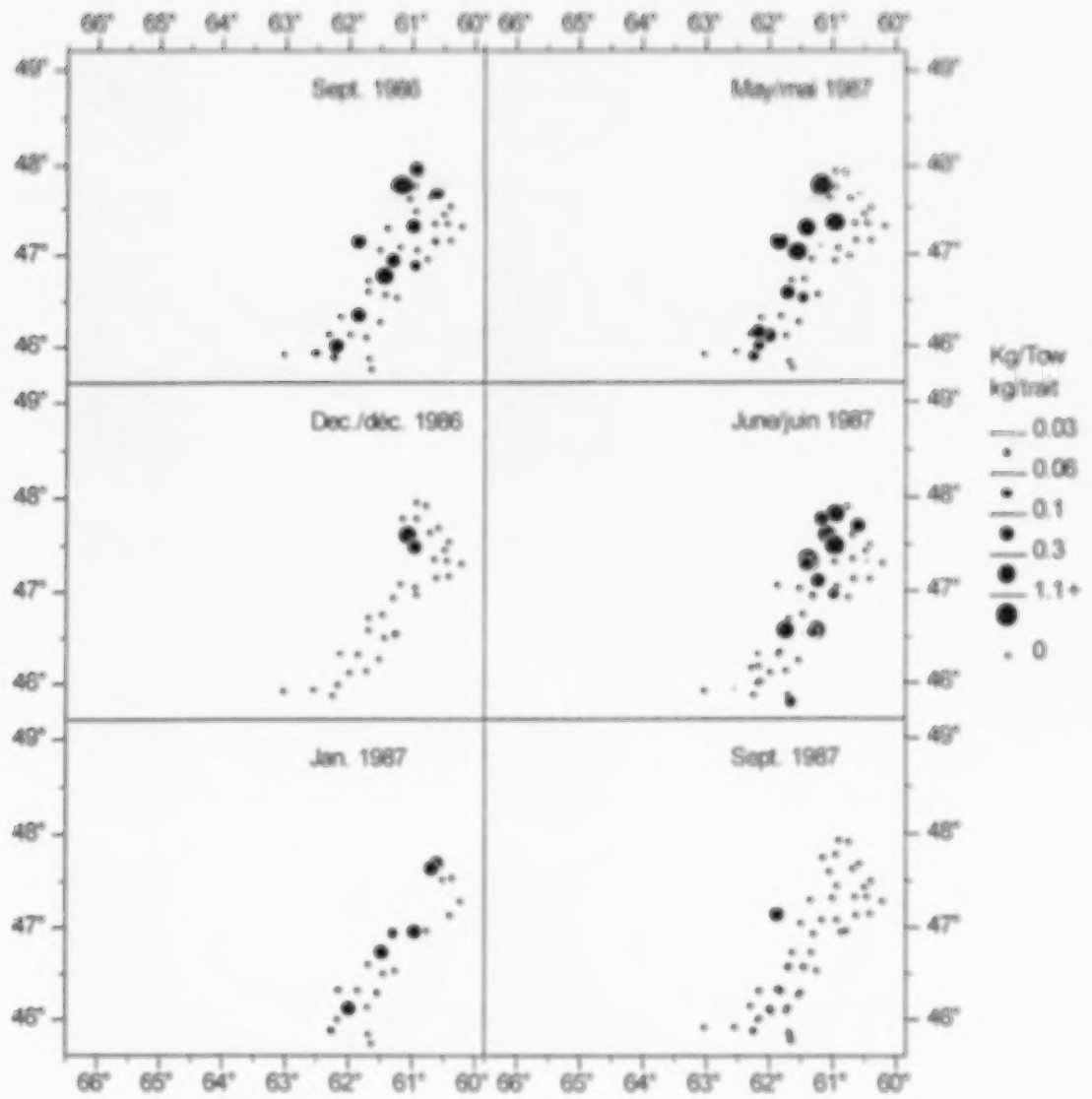

Figure 71a. S.E. Gulf of St. Lawrence seasonal distribution of catches (kg/tow) of Snails and Slugs, Gastropoda

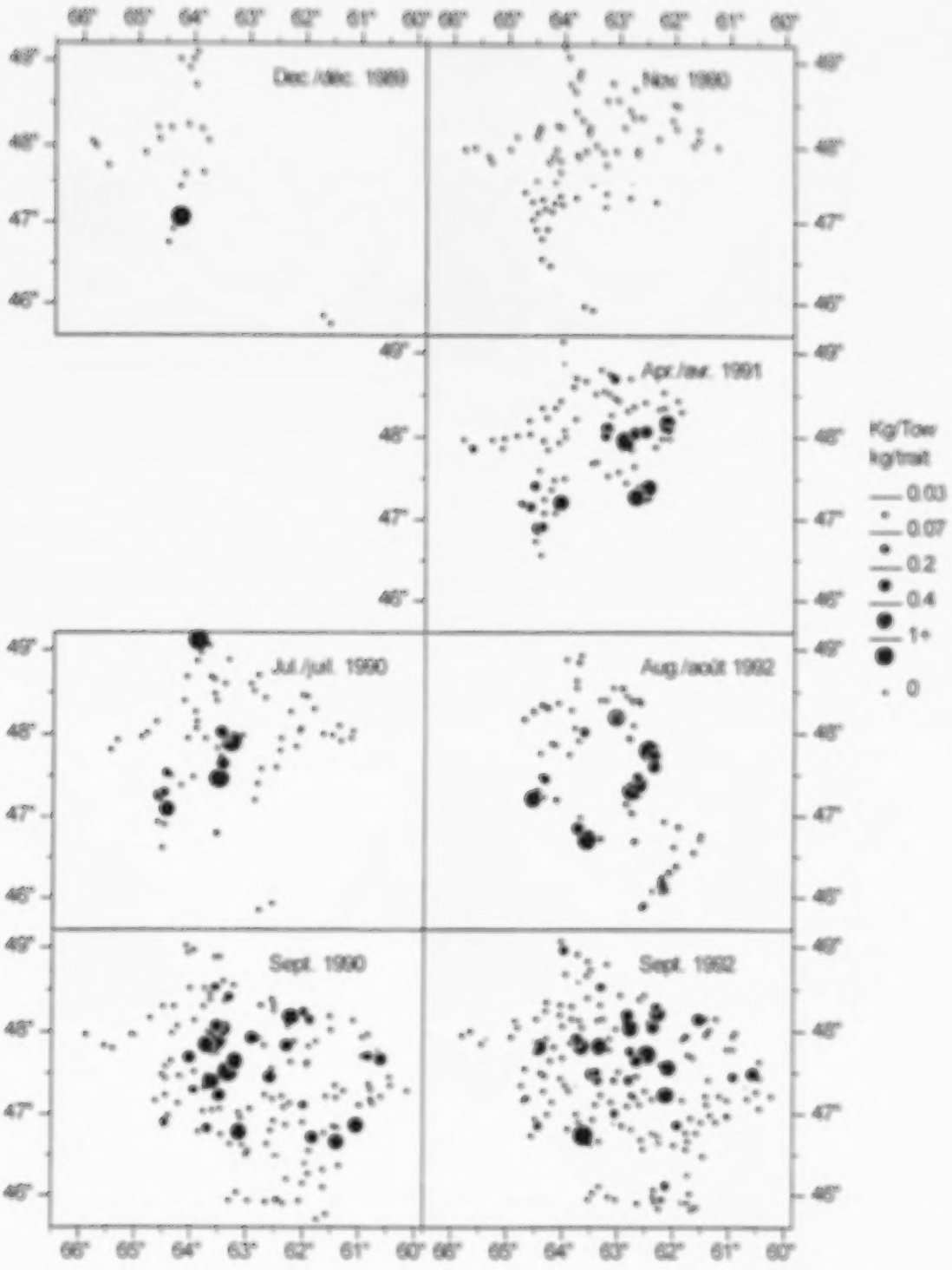

Figure 71b. S.W. Gulf of St. Lawrence seasonal distribution of catches (kg/tow) of Snails and Slugs, Gastropoda

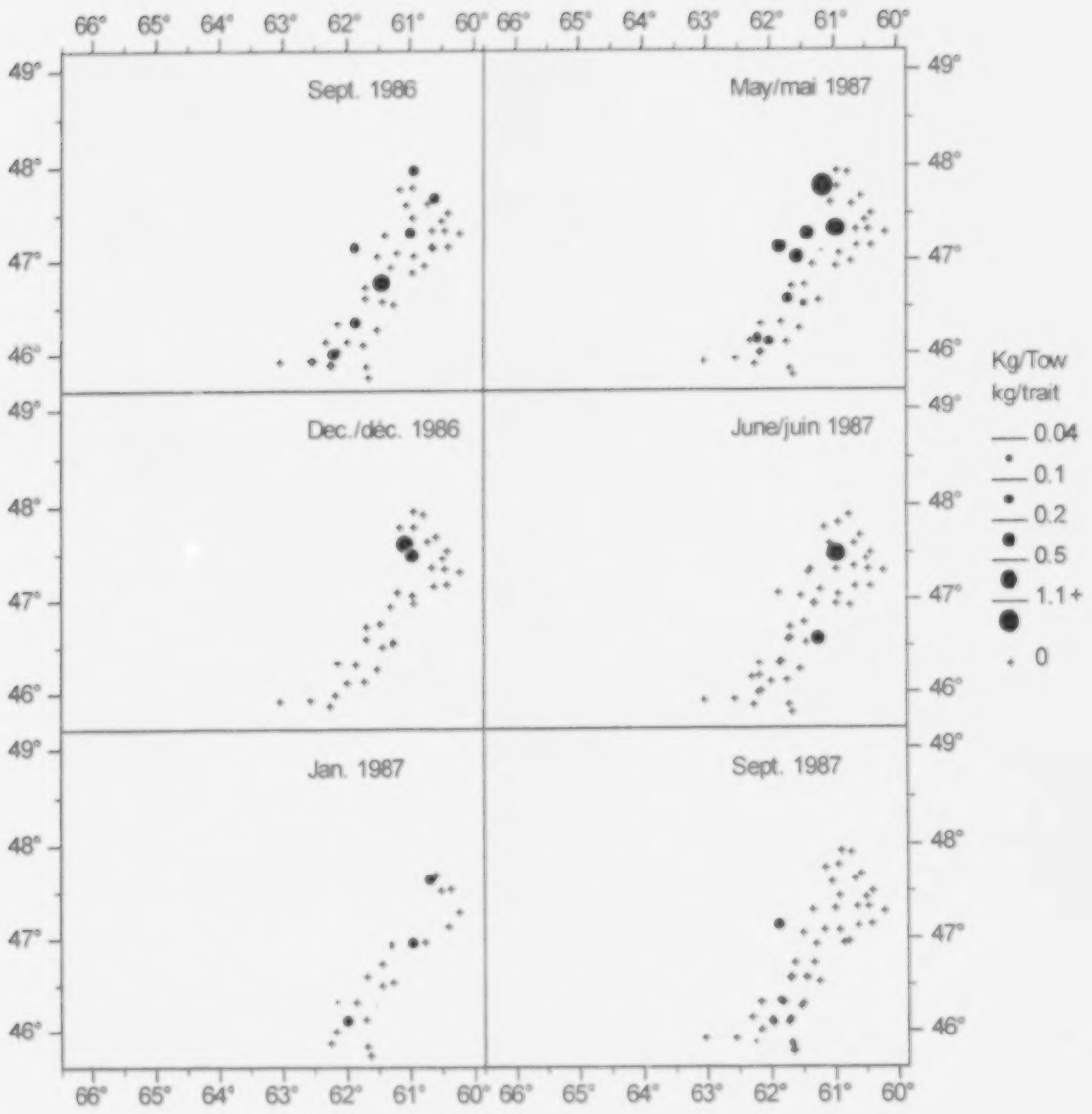

Figure 72a. S.E. Gulf of St. Lawrence seasonal distribution of catches (kg/tow) of Welks, *Buccinum sp.*

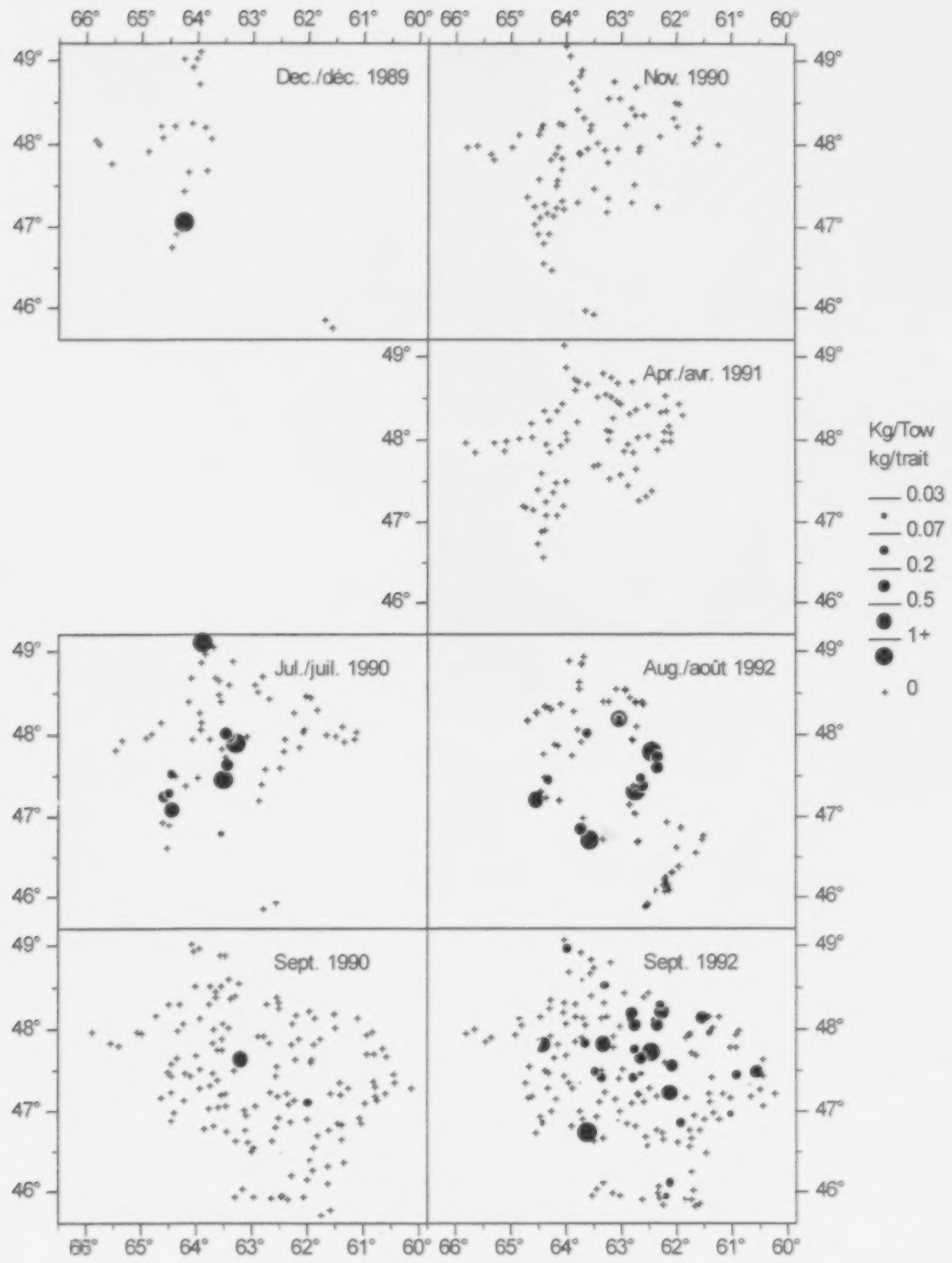

Figure 72b. S.W. Gulf of St. Lawrence seasonal distribution of catches (kg/tow) of Welks, *Buccinum sp.*

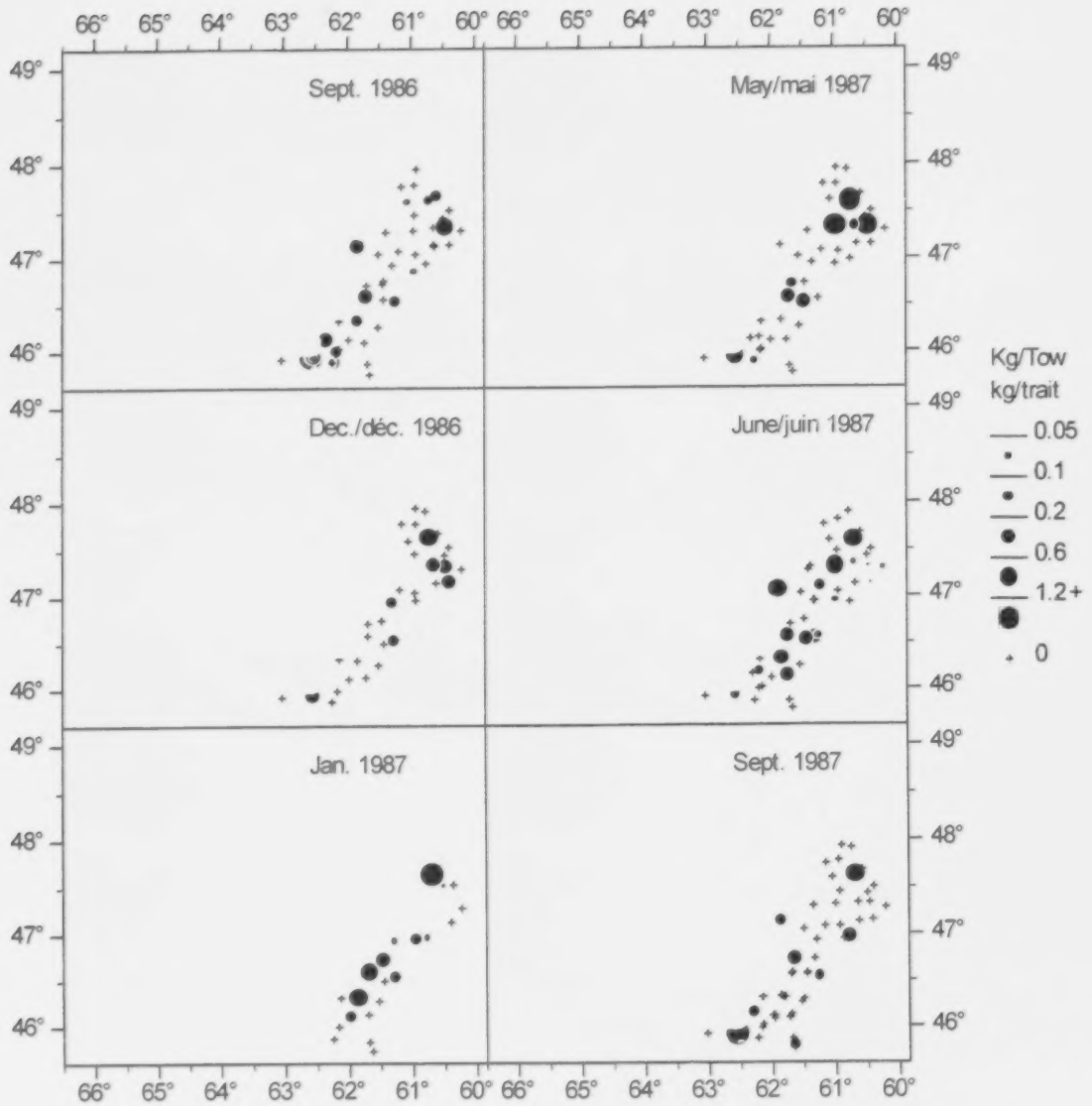

Figure 73a. S.E. Gulf of St. Lawrence seasonal distribution of catches (kg/tow) of Bivalve Molluscs, Bivalvia

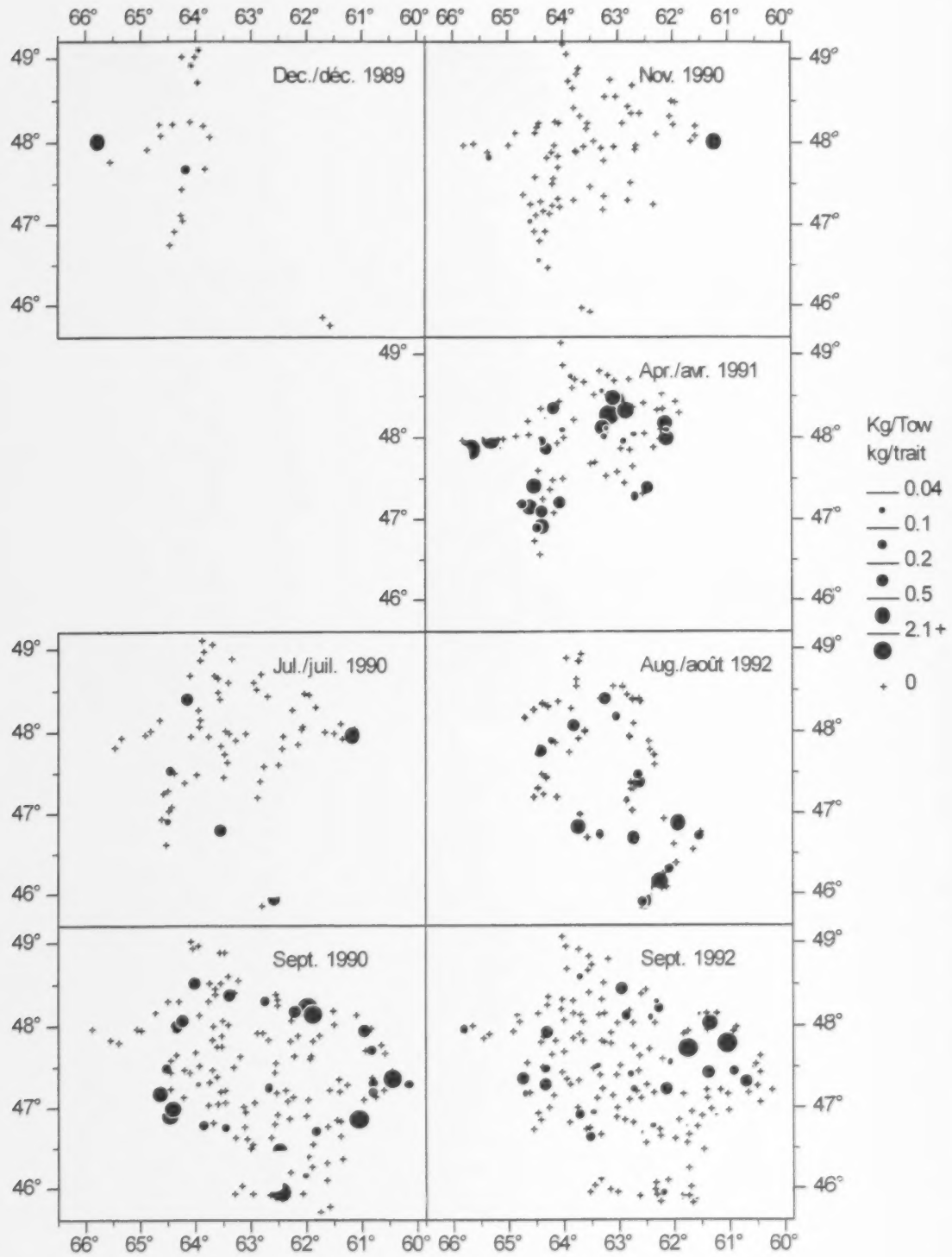

Figure 73b. S.W. Gulf of St. Lawrence seasonal distribution of catches (kg/tow) of Bivalve Molluscs, Bivalvia

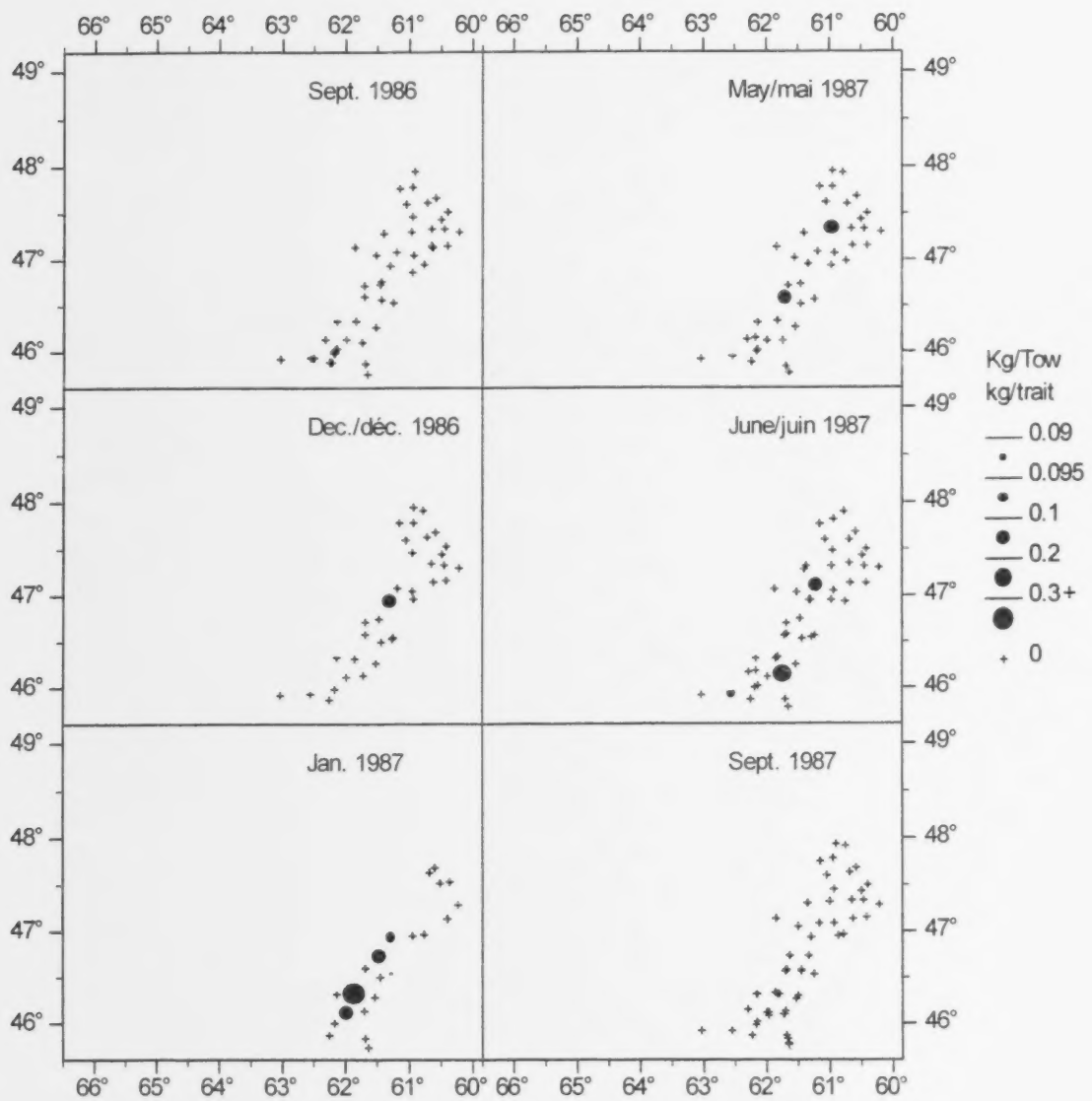

Figure 74a. S.E. Gulf of St. Lawrence seasonal distribution of catches (kg/tow) of Ocean Quahog, *Arctica islandica*

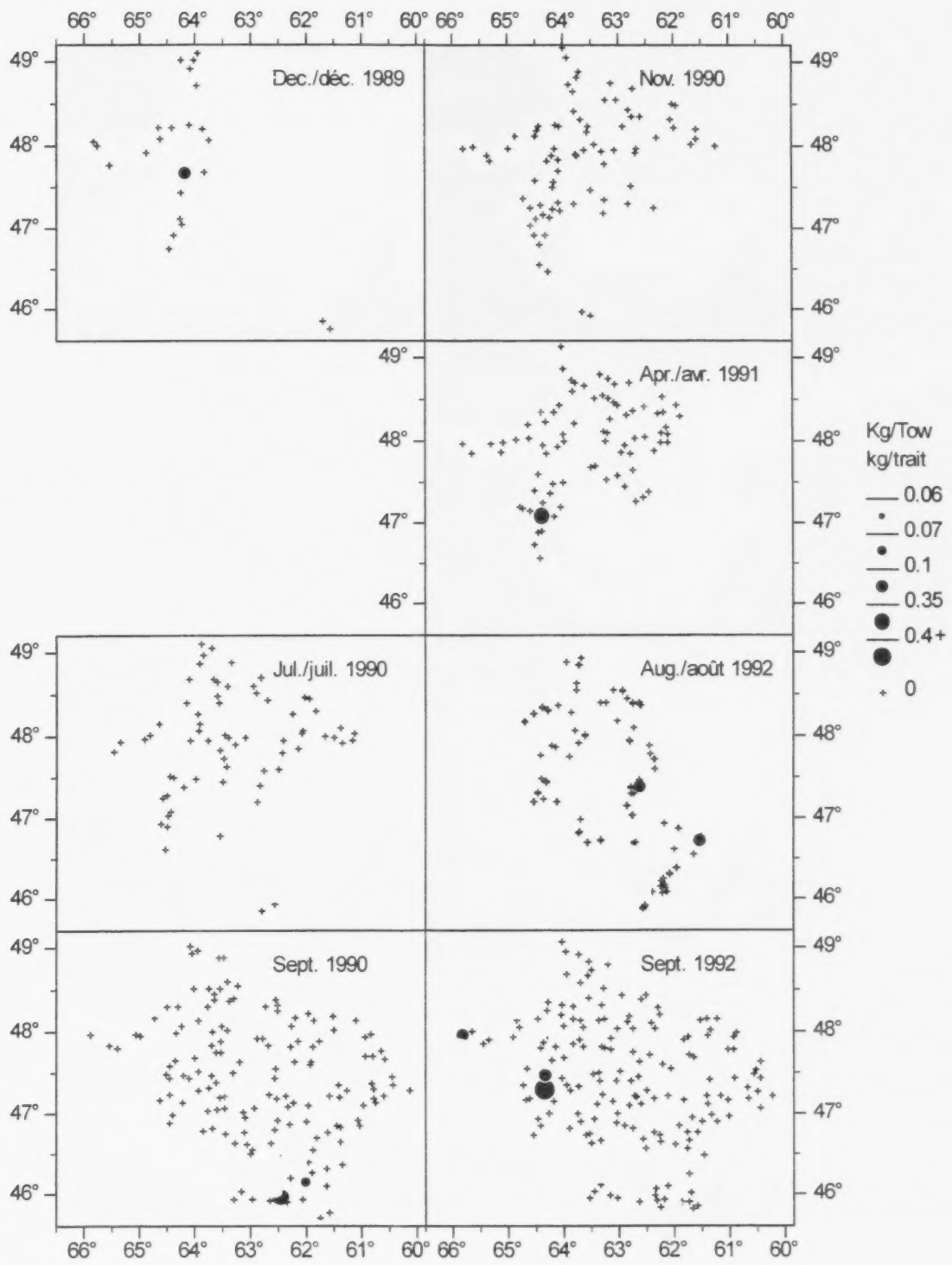

Figure 74b. S.W. Gulf of St. Lawrence seasonal distribution of catches (kg/tow) of Ocean Quahog, *Arctica islandica*

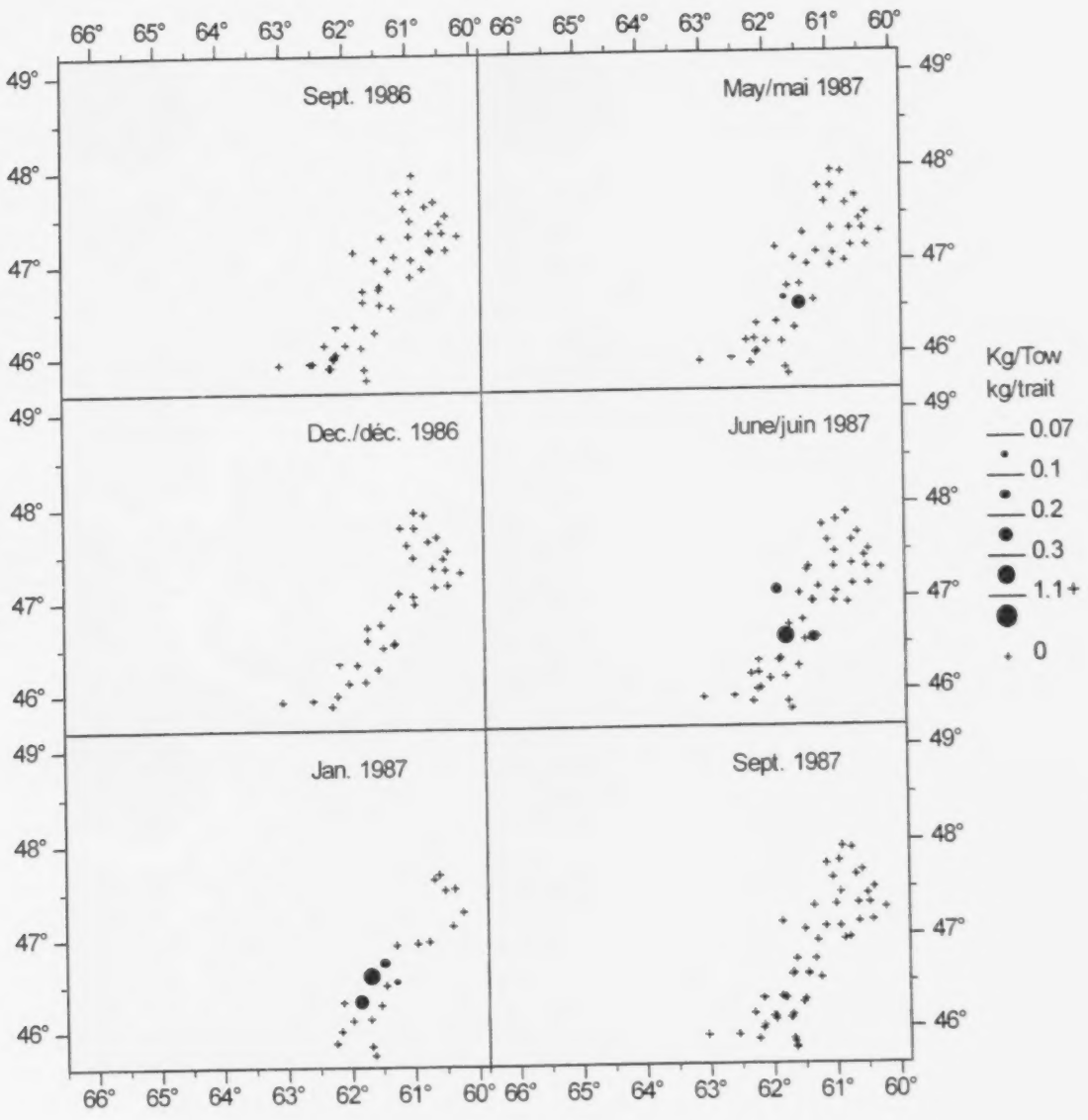

Figure 75a. S.E. Gulf of St. Lawrence seasonal distribution of catches (kg/tow) of Cockles, Cardiidae

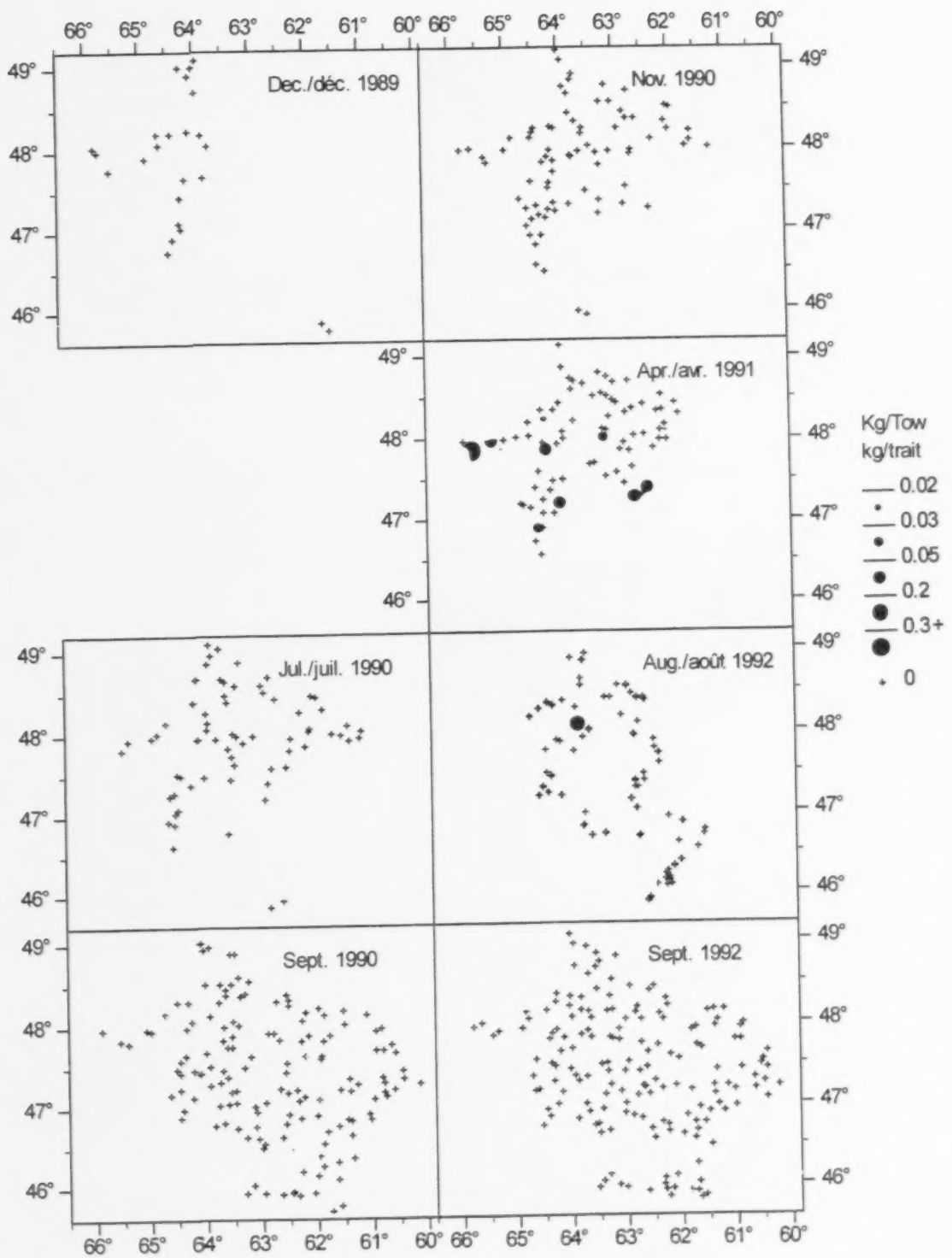

Figure 75b. S.W. Gulf of St. Lawrence seasonal distribution of catches (kg/tow) of Cockles, Cardiidae

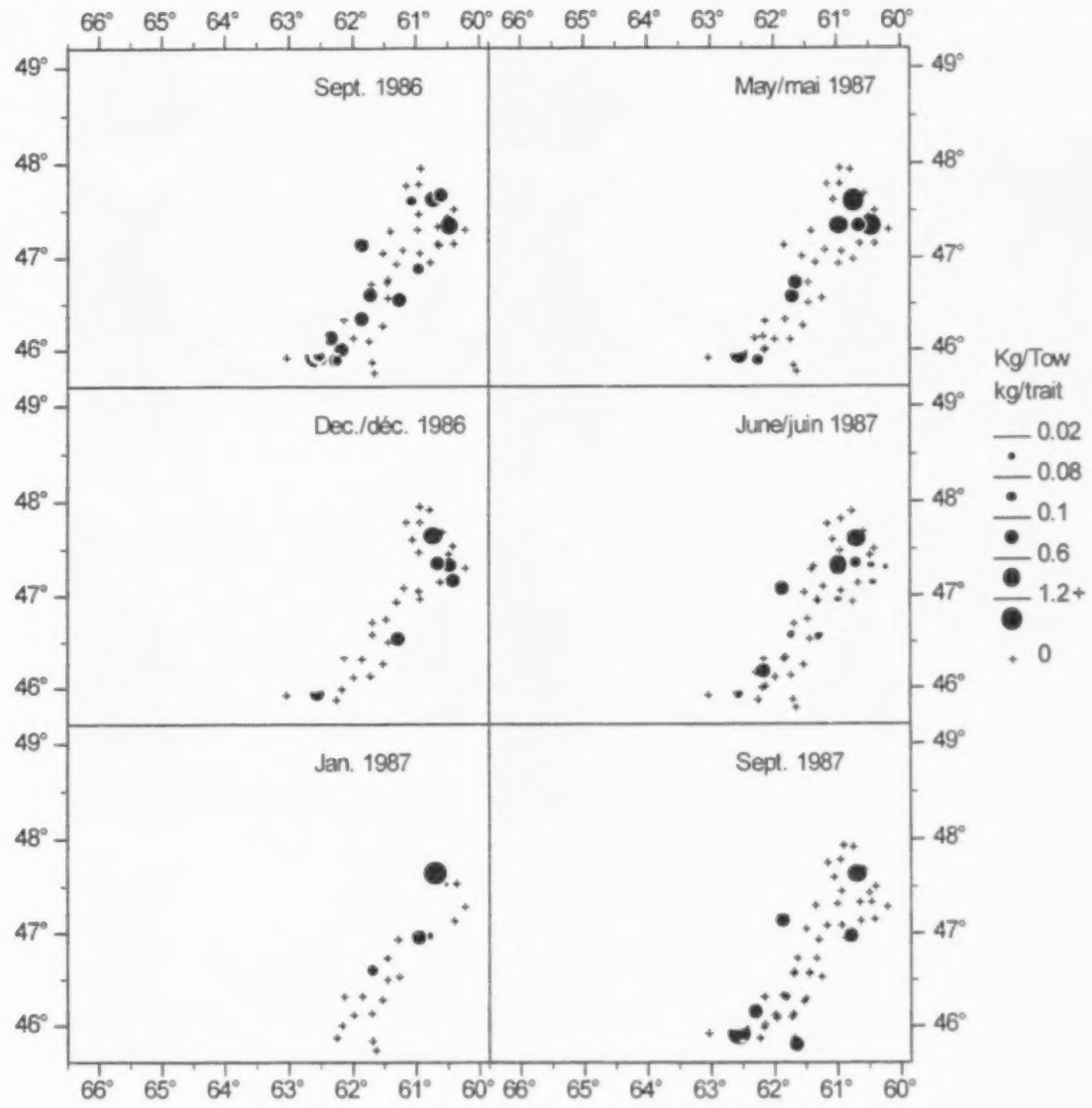

Figure 76a. S.E. Gulf of St. Lawrence seasonal distribution of catches (kg/tow) of Scallops, Pectinidae

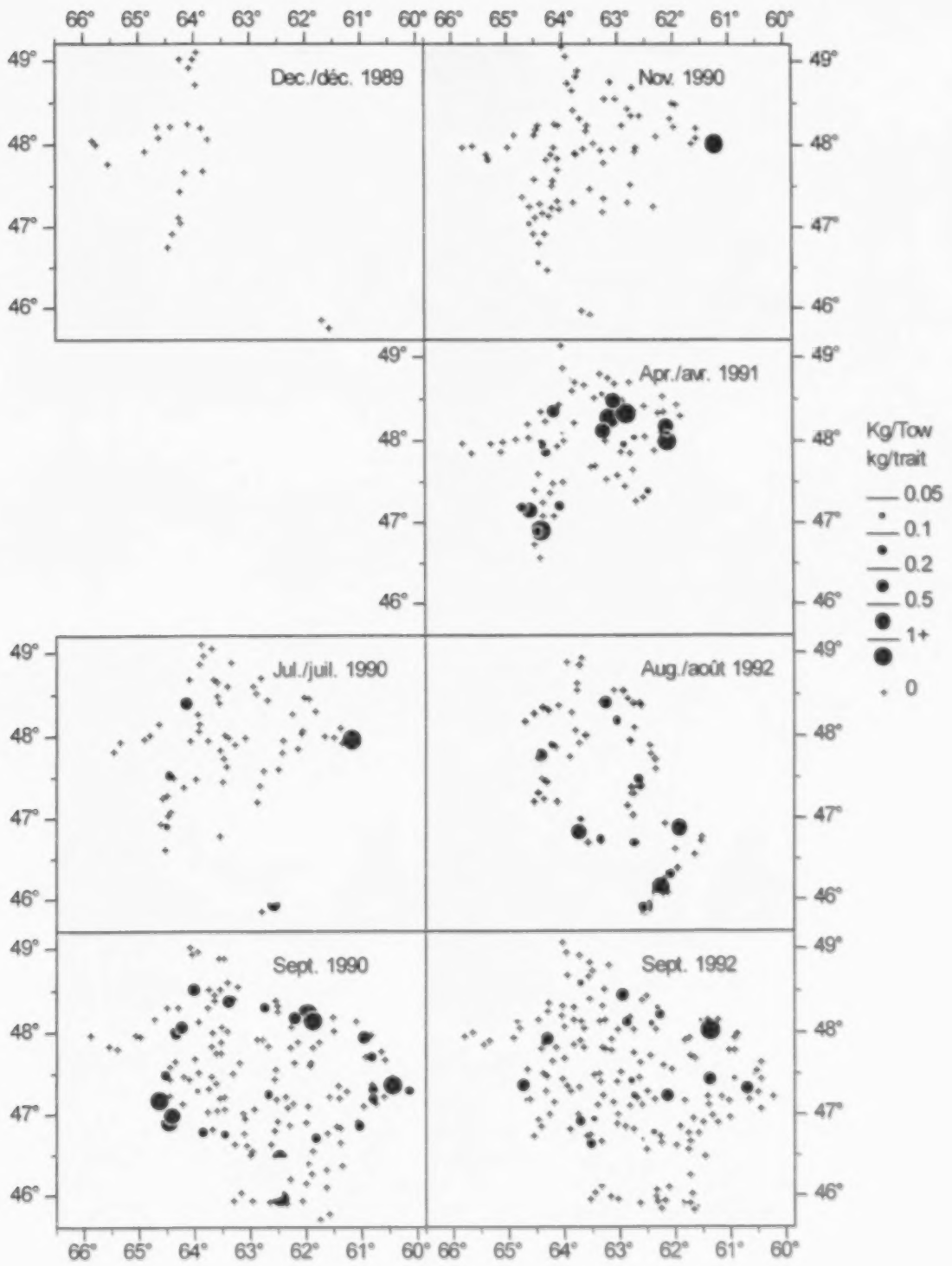

Figure 76b. S.W. Gulf of St. Lawrence seasonal distribution of catches (kg/tow) of Scallops, Pectinidae

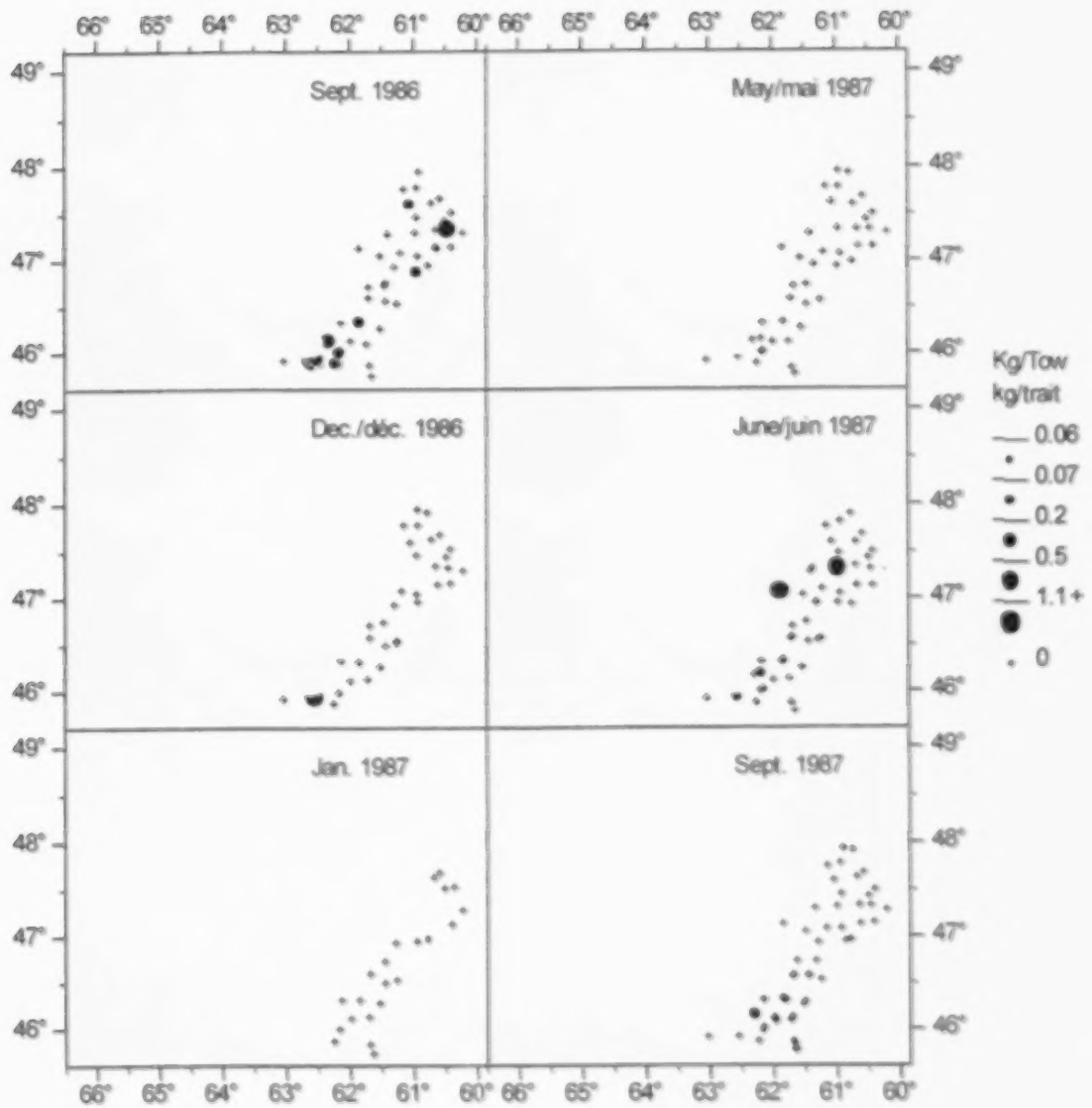

Figure 77a. S.E. Gulf of St. Lawrence seasonal distribution of catches (kg/tow) of Sea Scallop, *Placopecten magellanicus*

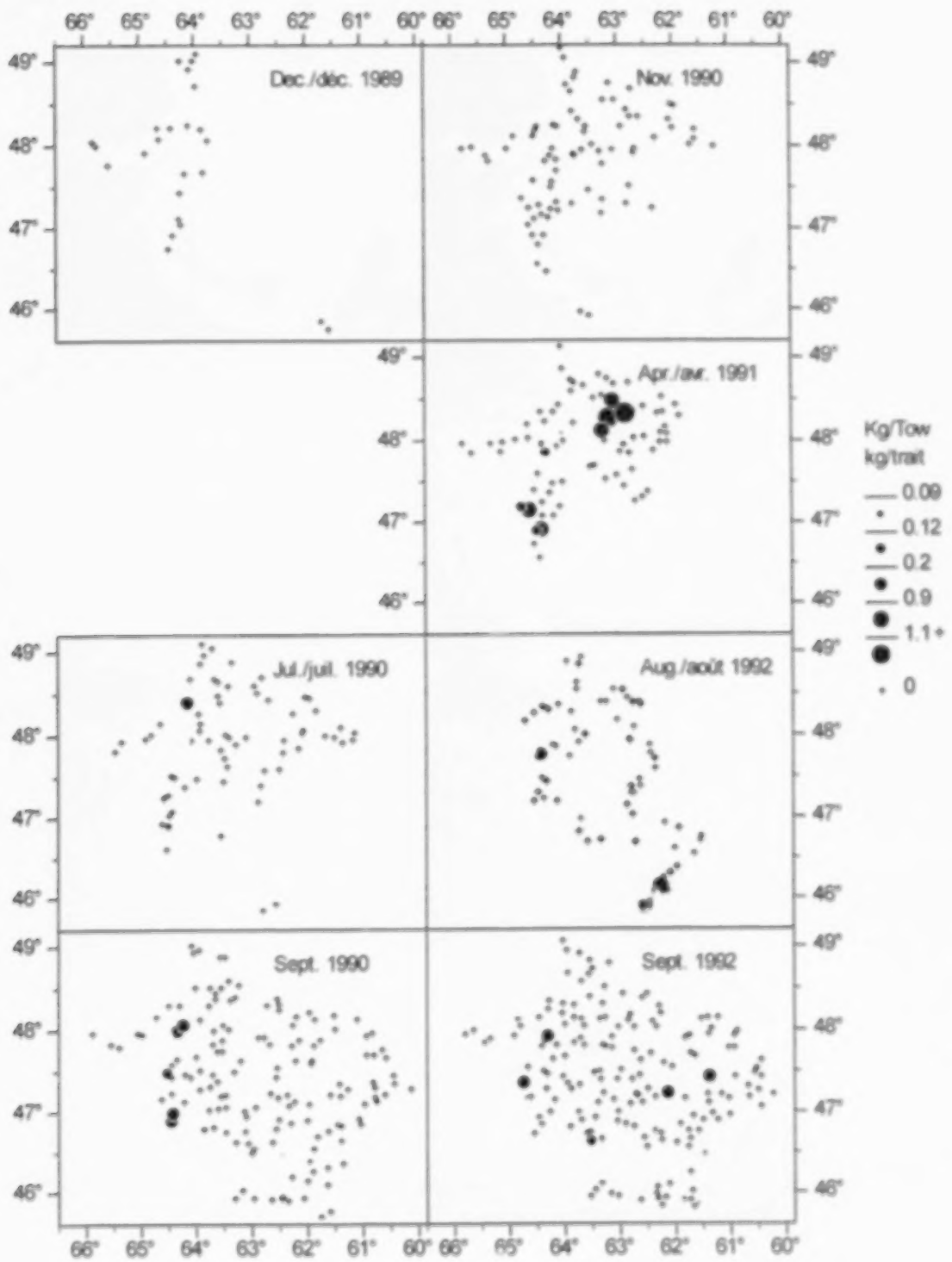

Figure 77b. S.W. Gulf of St. Lawrence seasonal distribution of catches (kg/tow) of Sea Scallop, *Placopecten magellanicus*

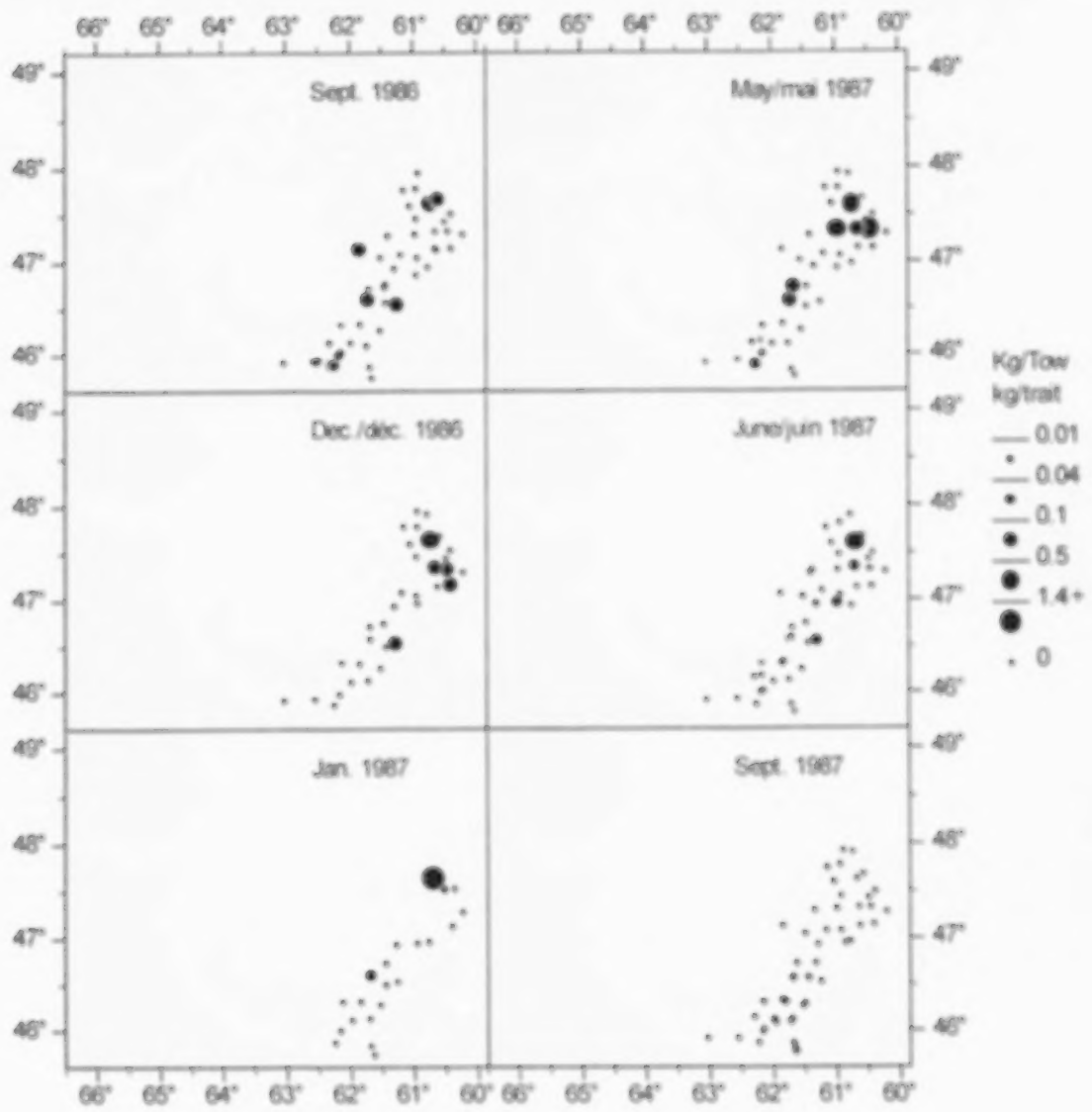

Figure 78a. S.E. Gulf of St. Lawrence seasonal distribution of catches (kg/tow) of Iceland Scallop, *Chlamys islandicus*

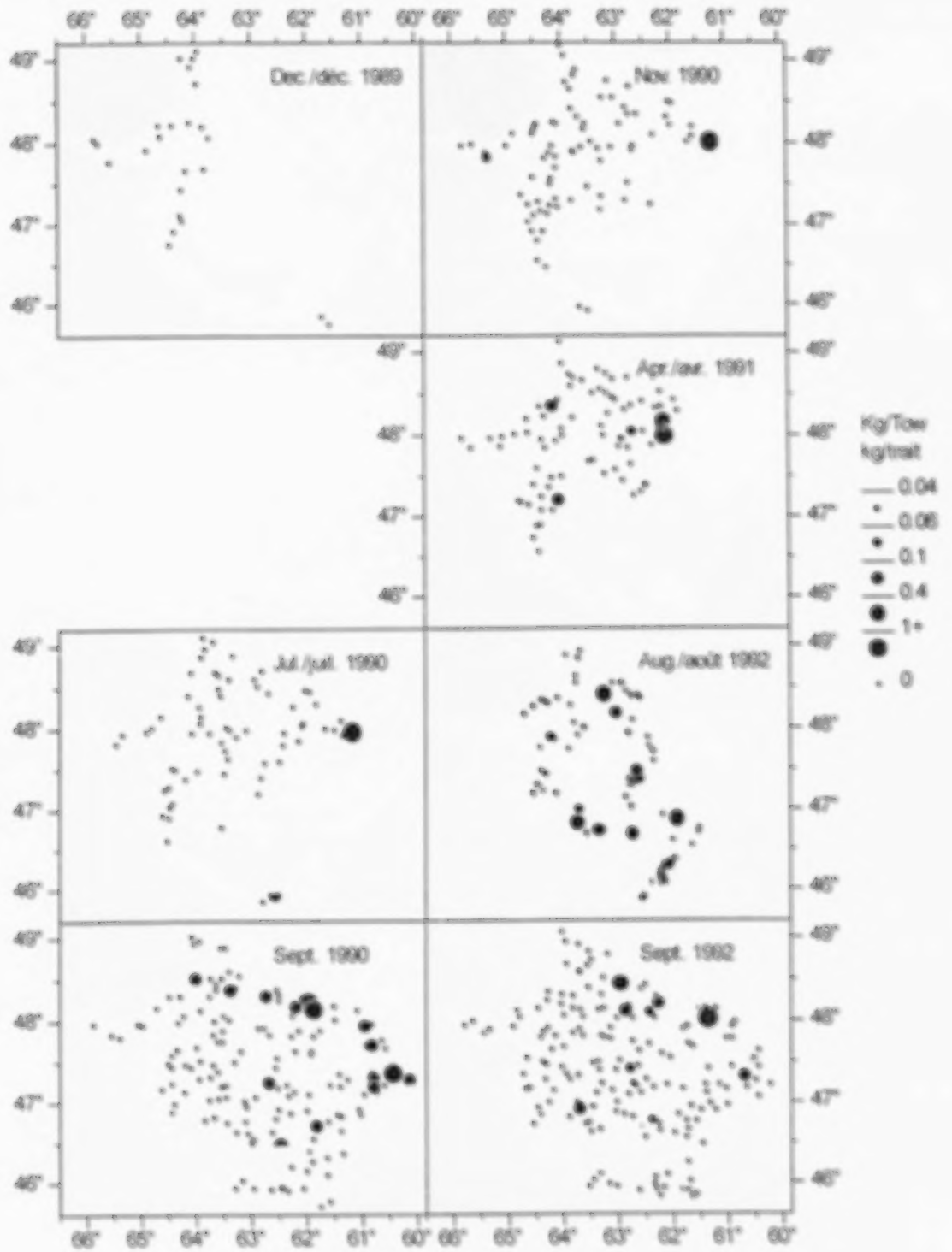

Figure 7Bb. S.W. Gulf of St. Lawrence seasonal distribution of catches (kg/tow) of Iceland Scallop, *Chlamys islandicus*

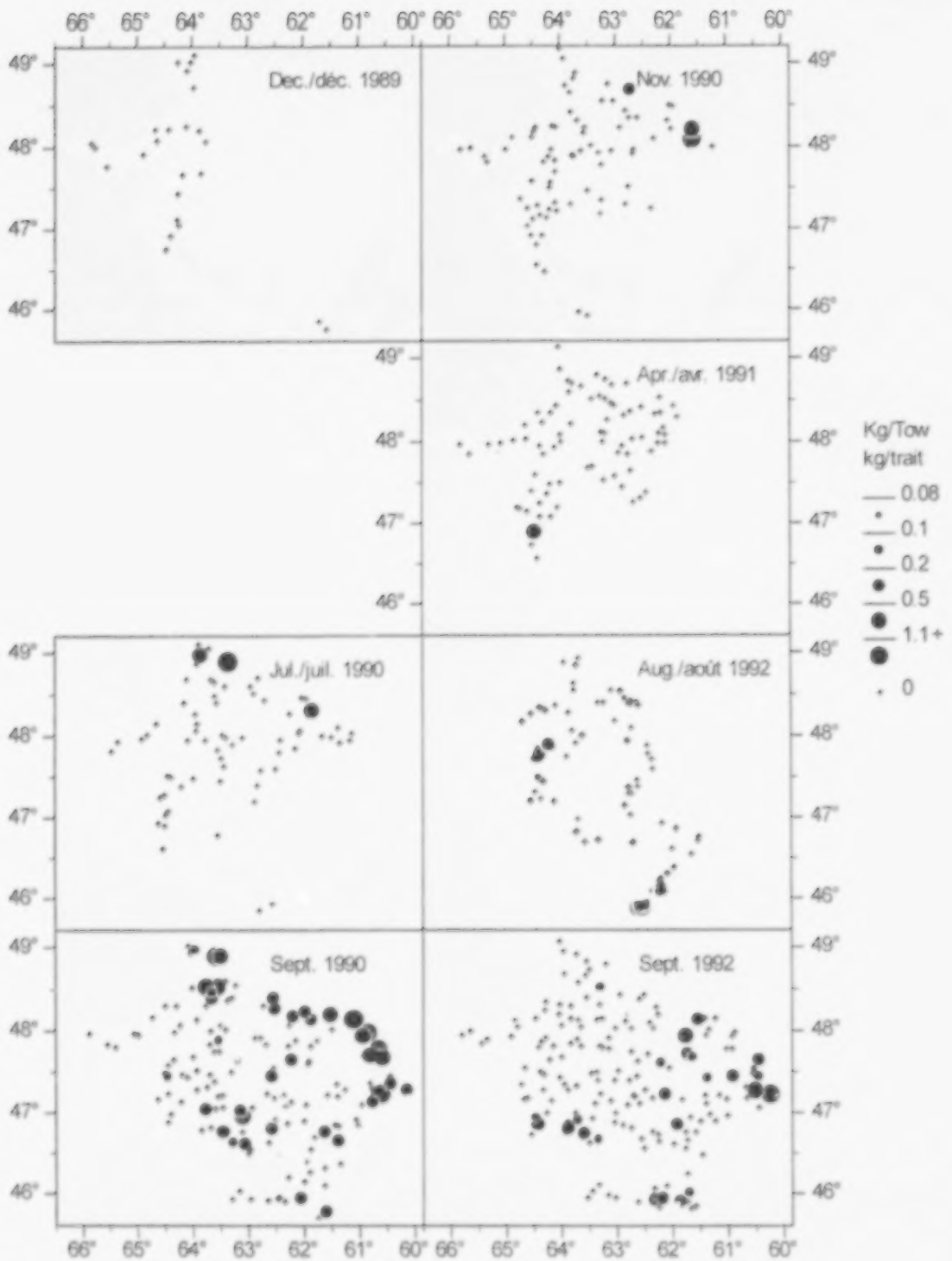

Figure 79. S.W. Gulf of St. Lawrence seasonal distribution of catches (kg/tow) of Nonspecified Squid, Ommastrephidae, Loliginidae

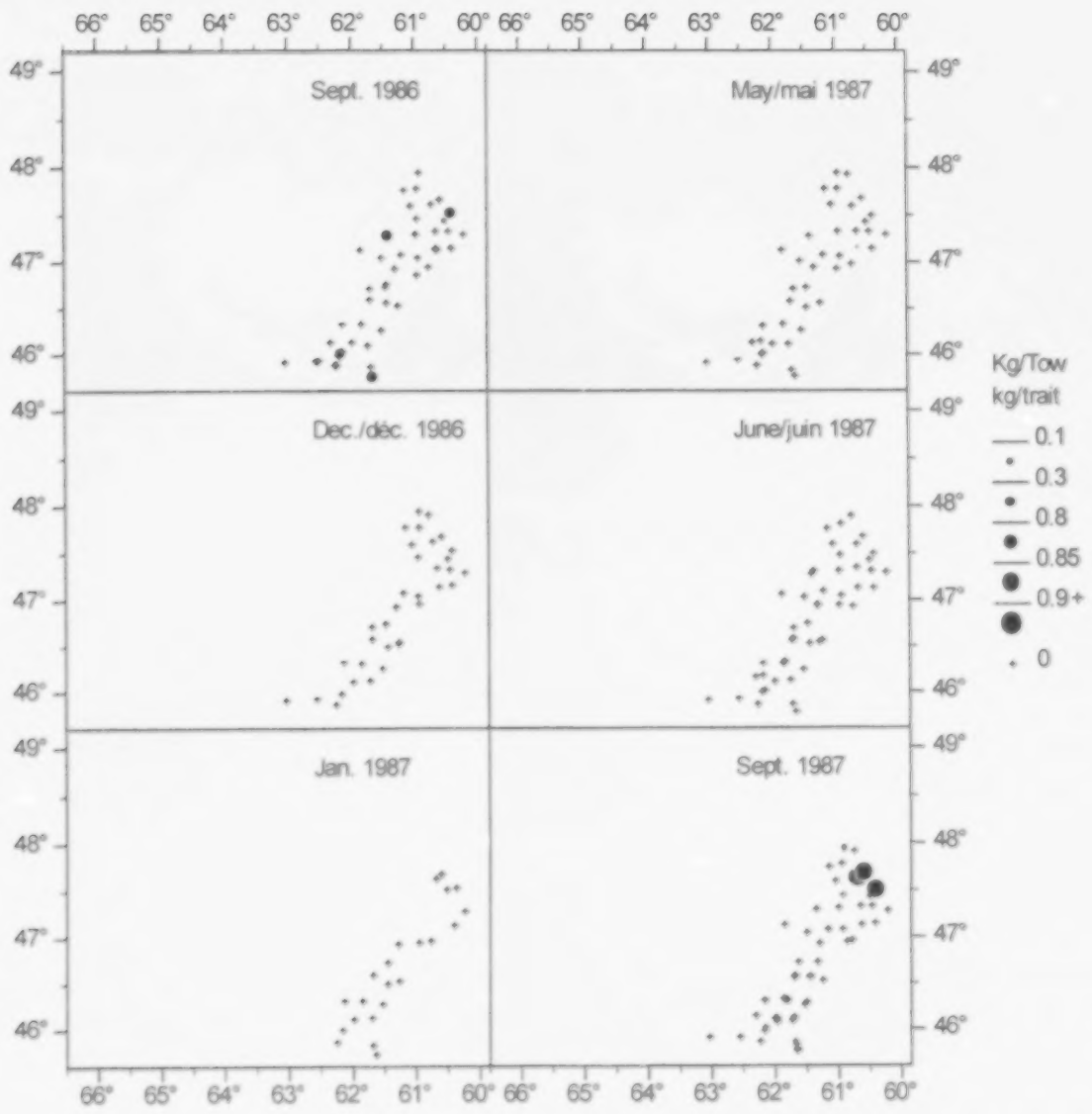

Figure 80a. S.E. Gulf of St. Lawrence seasonal distribution of catches (kg/tow) of Short-Finned Squid, *Illex illecebrosus*

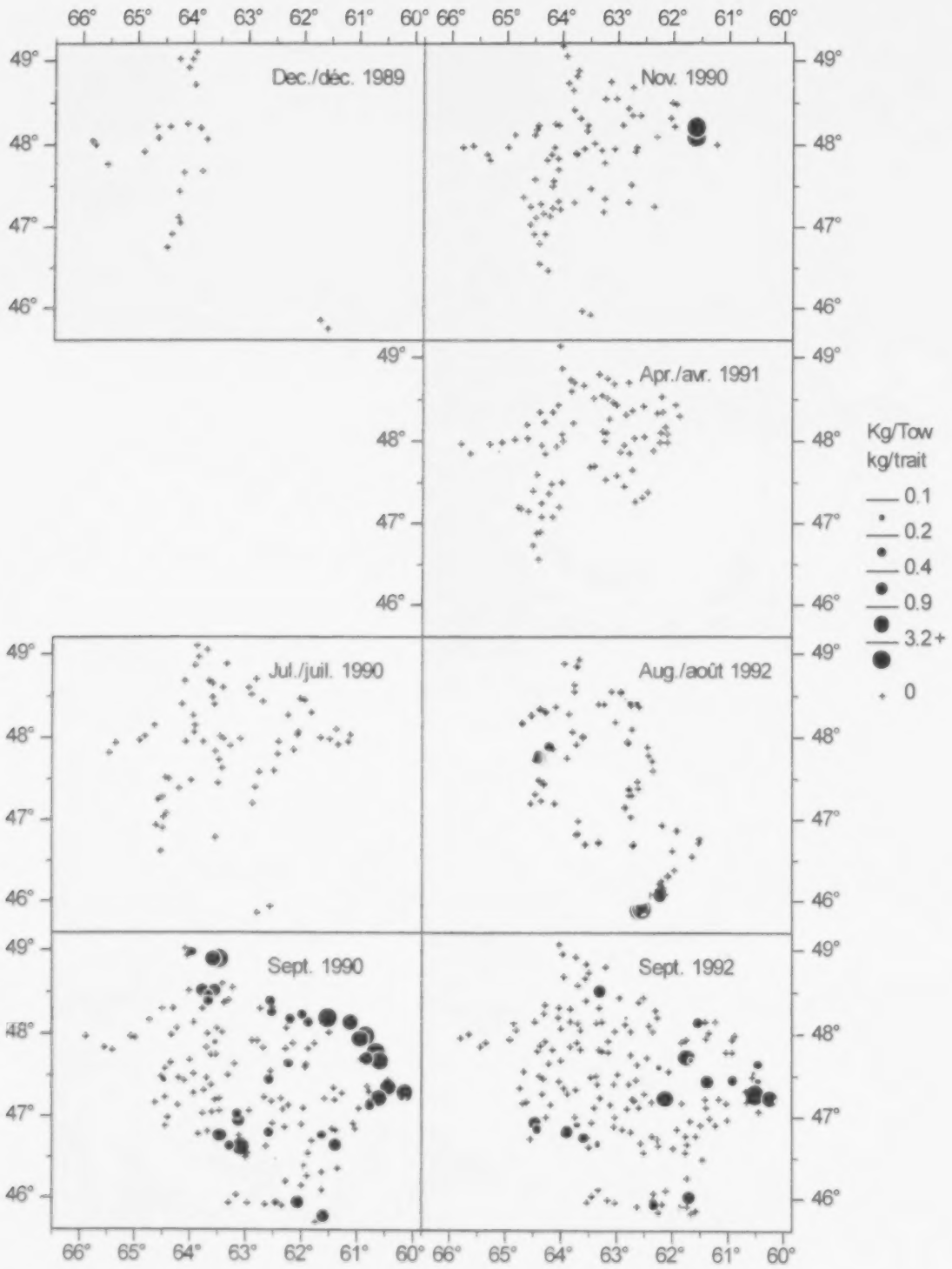

Figure 80b. S.W. Gulf of St. Lawrence seasonal distribution of catches (kg/tow) of Short-Finned Squid, *Illex illecebrosus*

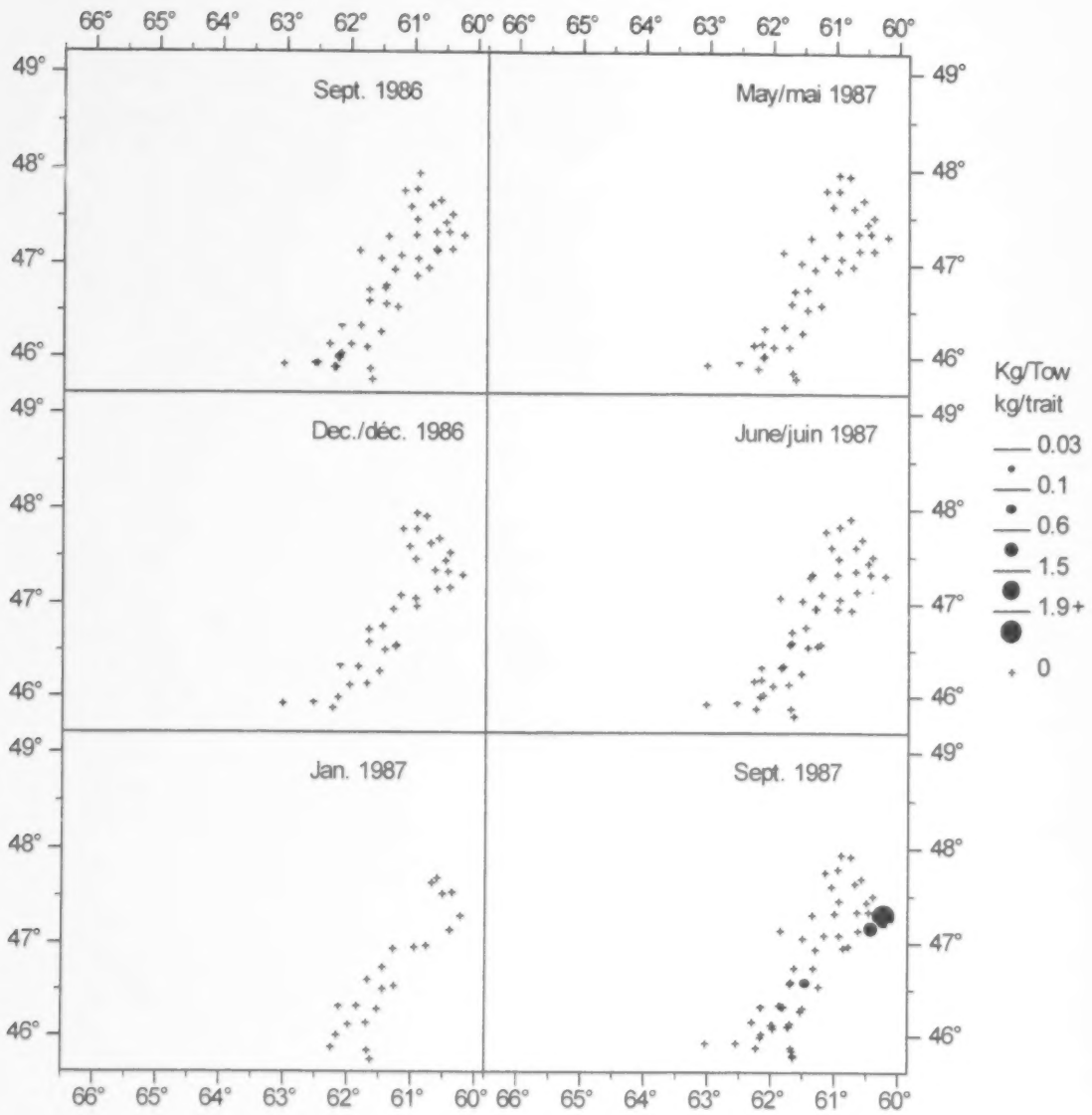

Figure 81a. S.E. Gulf of St. Lawrence seasonal distribution of catches (kg/tow) of Long-Finned Squid, *Loligo pealei*

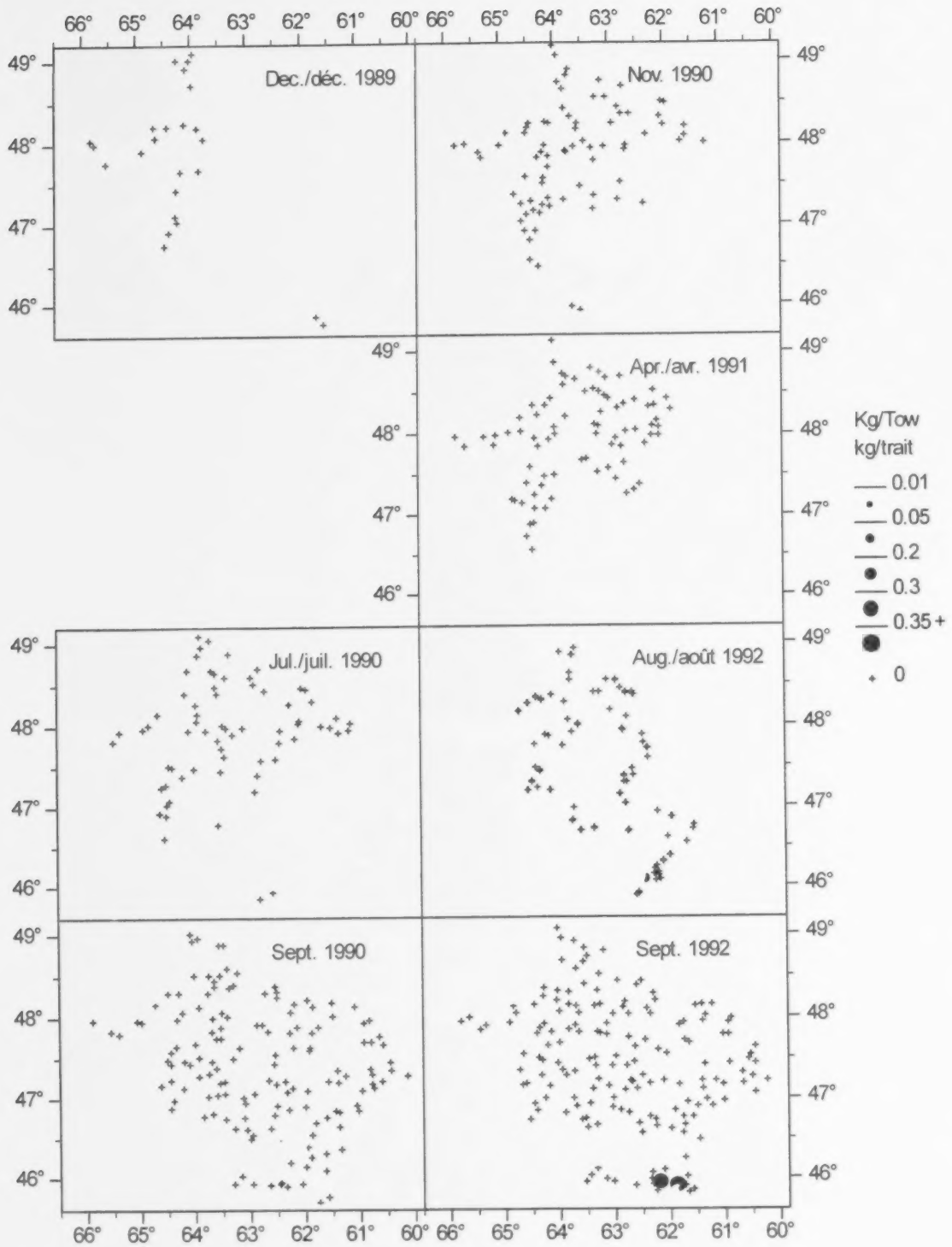

Figure 81b. S.W. Gulf of St. Lawrence seasonal distribution of catches (kg/tow) of Long-Finned Squid, *Loligo pealei*

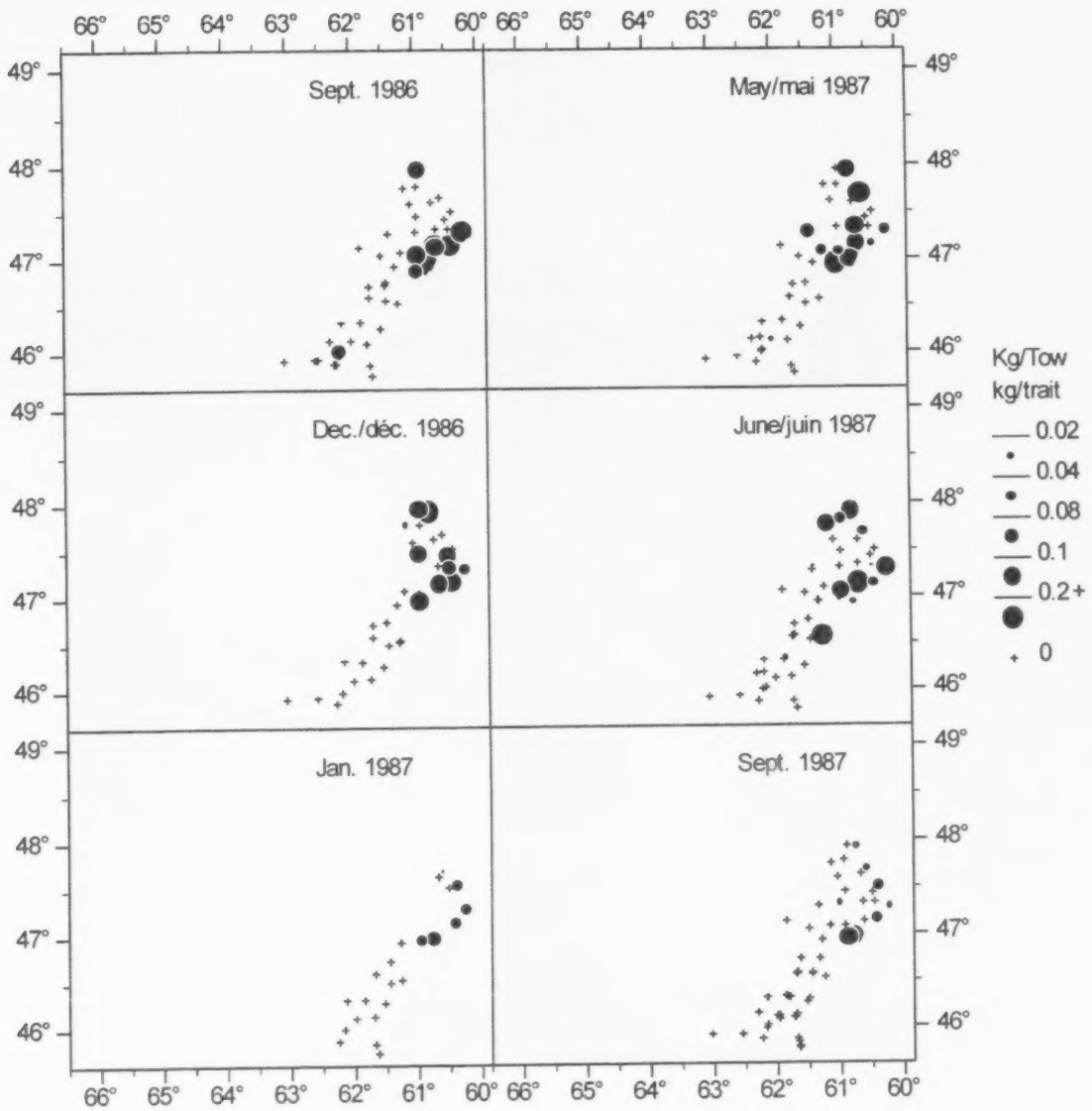

Figure 82a. S.E. Gulf of St. Lawrence seasonal distribution of catches (kg/tow) of Octopus, Octopoda

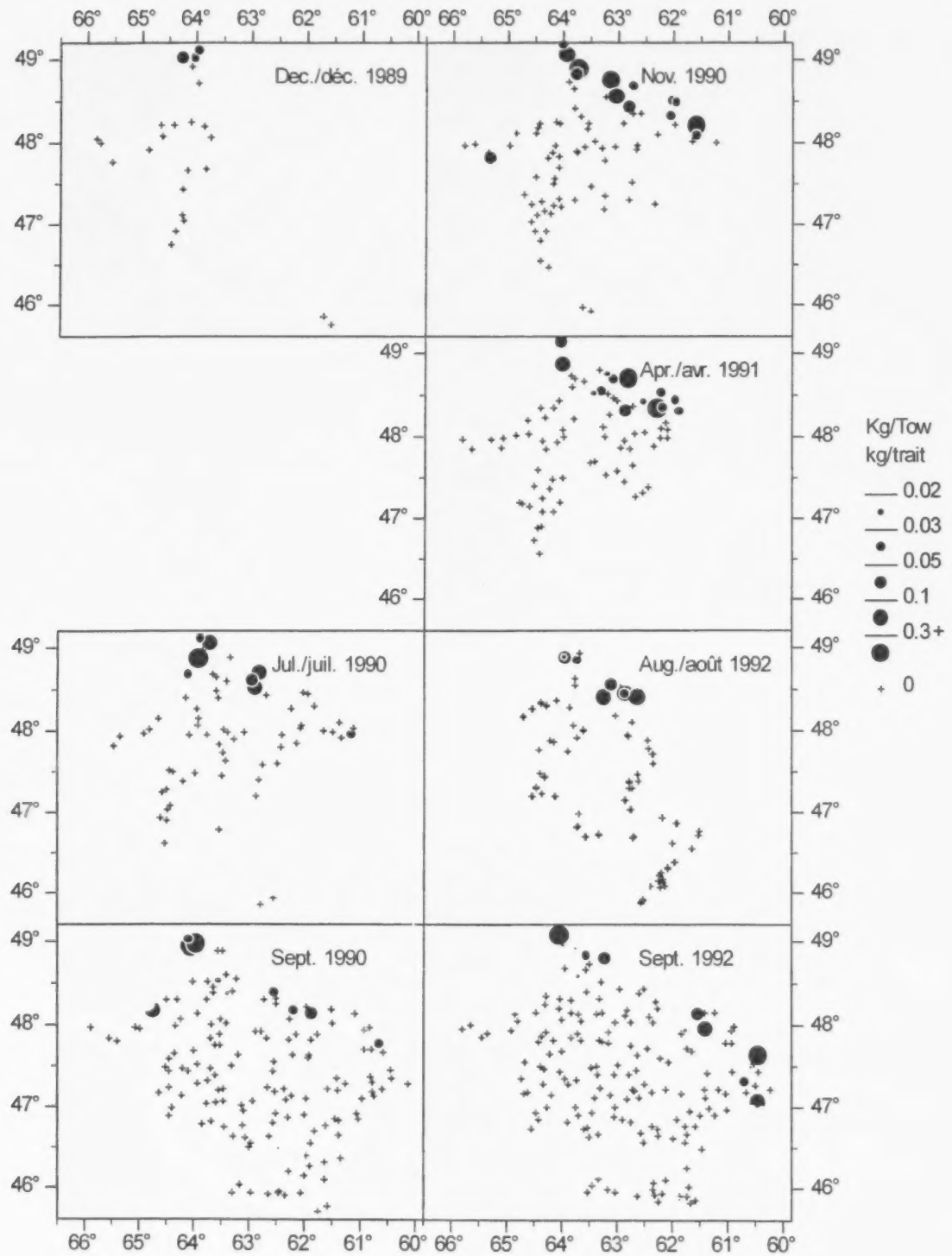

Figure 82b. S.W. Gulf of St. Lawrence seasonal distribution of catches (kg/tow) of Octopus, Octopoda

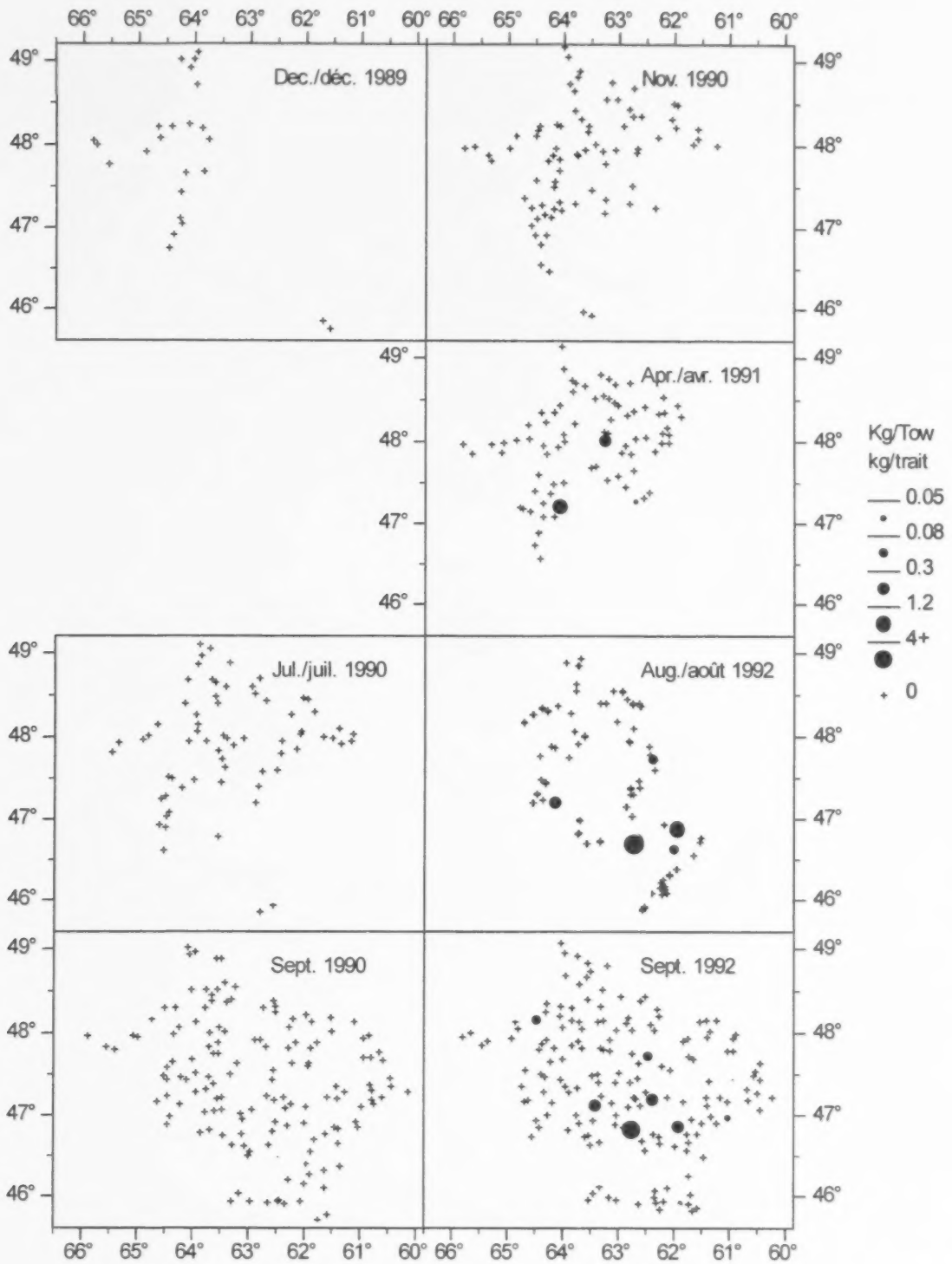

Figure 83. S.W. Gulf of St. Lawrence seasonal distribution of catches (kg/tow) of Chitons, Polyplacophora

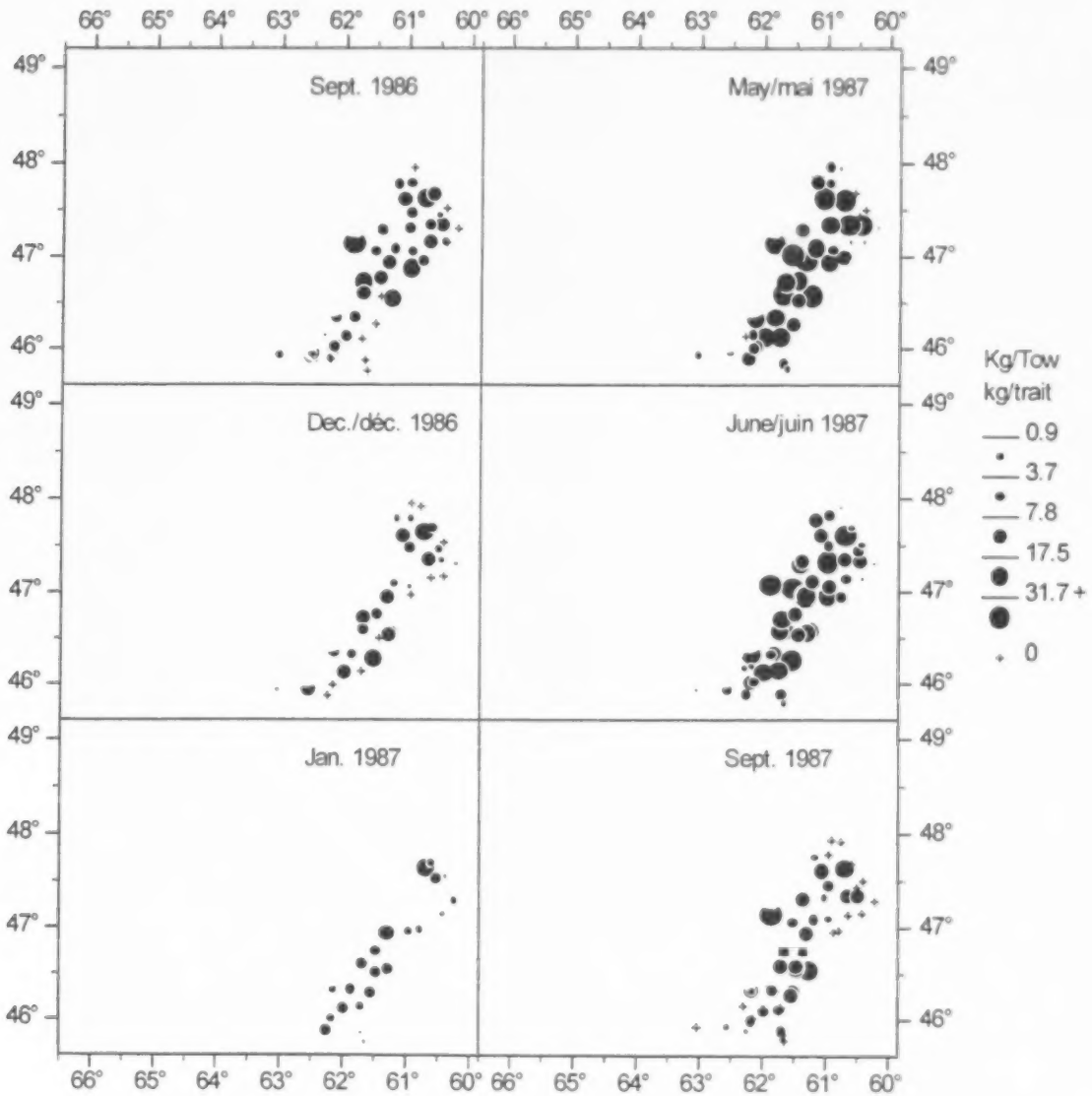

Figure 84a. S.E. Gulf of St. Lawrence seasonal distribution of catches (kg/tow) of Echinoderms, Echinodermata

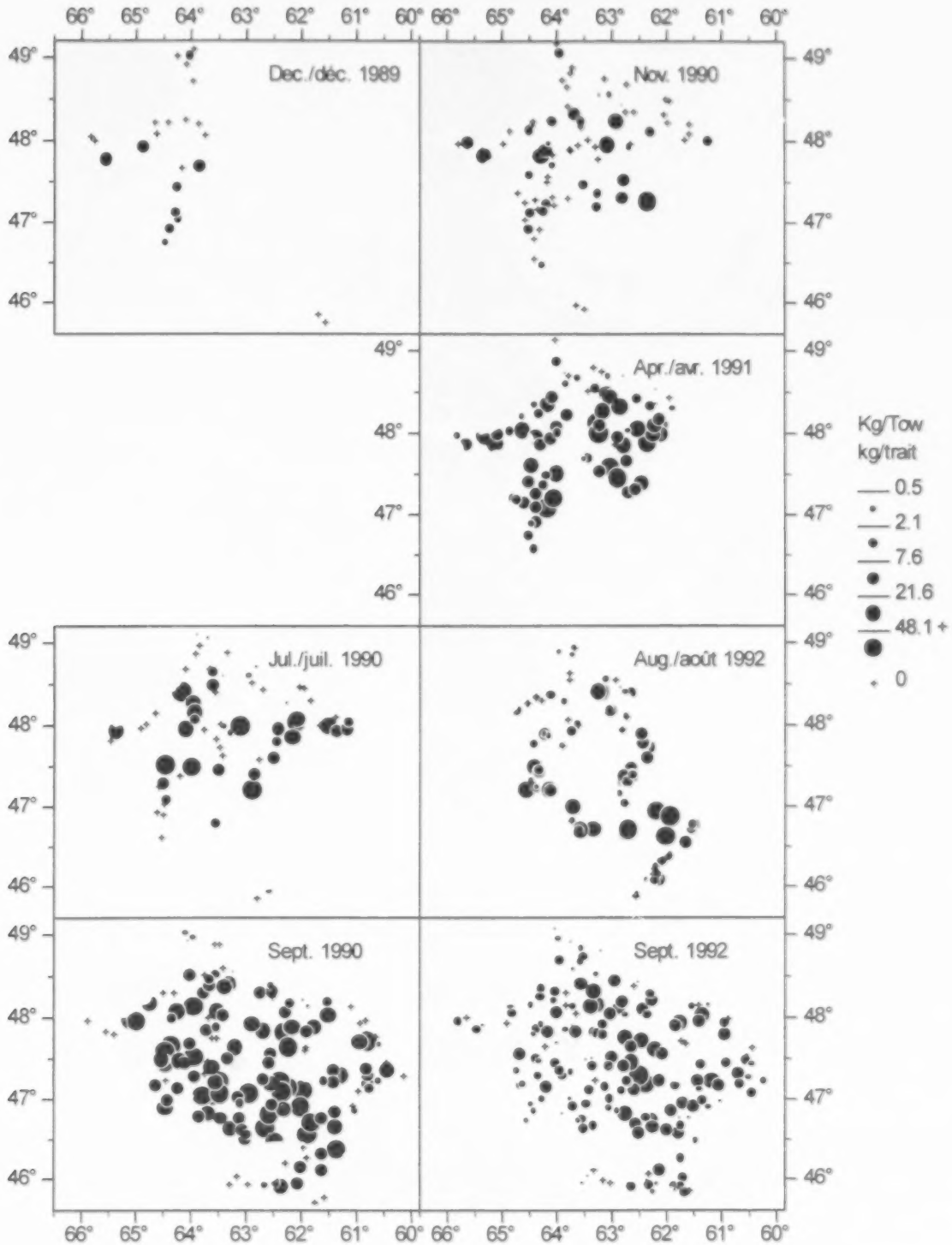

Figure 84b. S.W. Gulf of St. Lawrence seasonal distribution of catches (kg/tow) of Echinoderms, Echinodermata

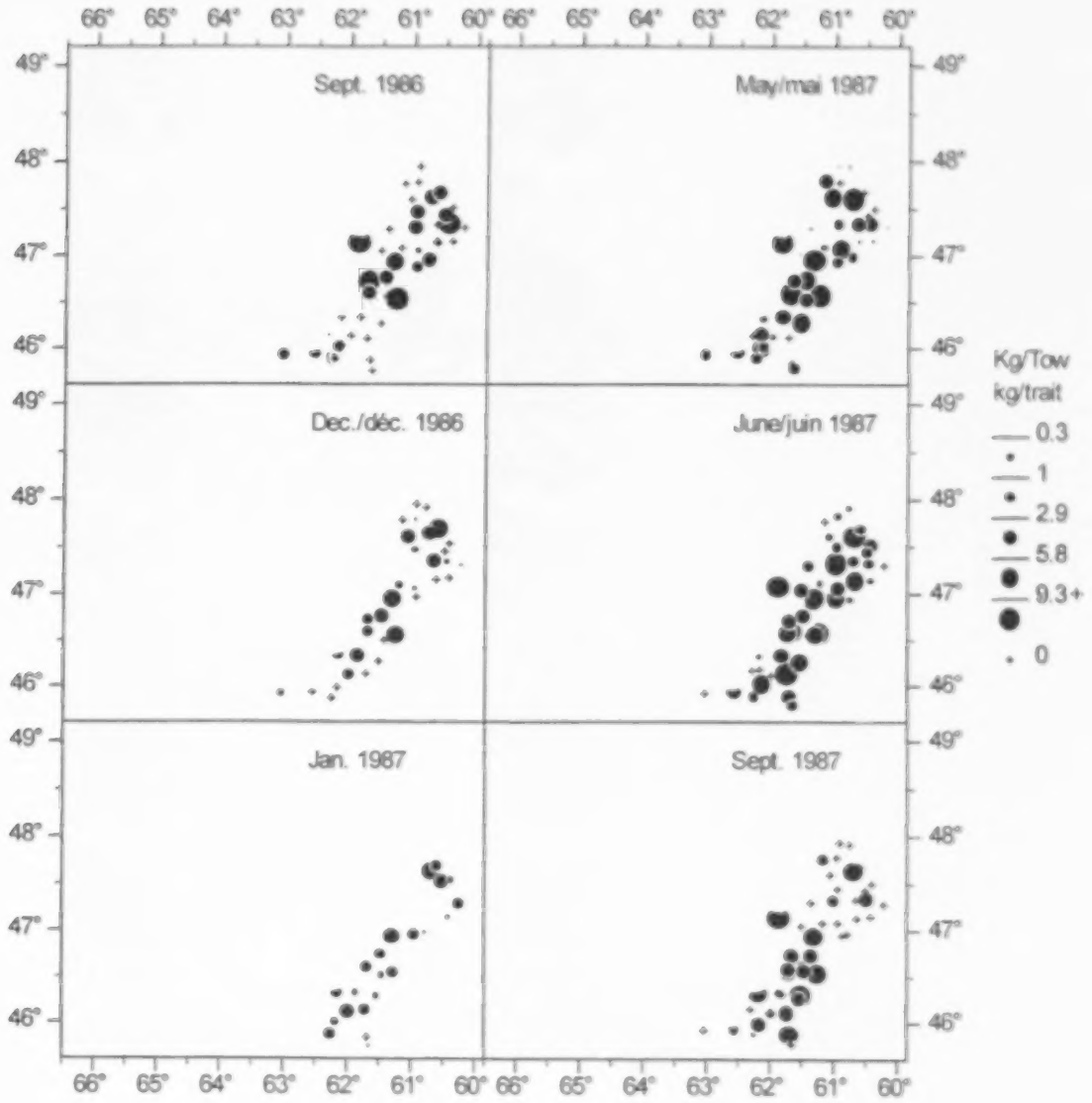

Figure 85a. S.E. Gulf of St. Lawrence seasonal distribution of catches (kg/tow) of Starfish, Asteroidea

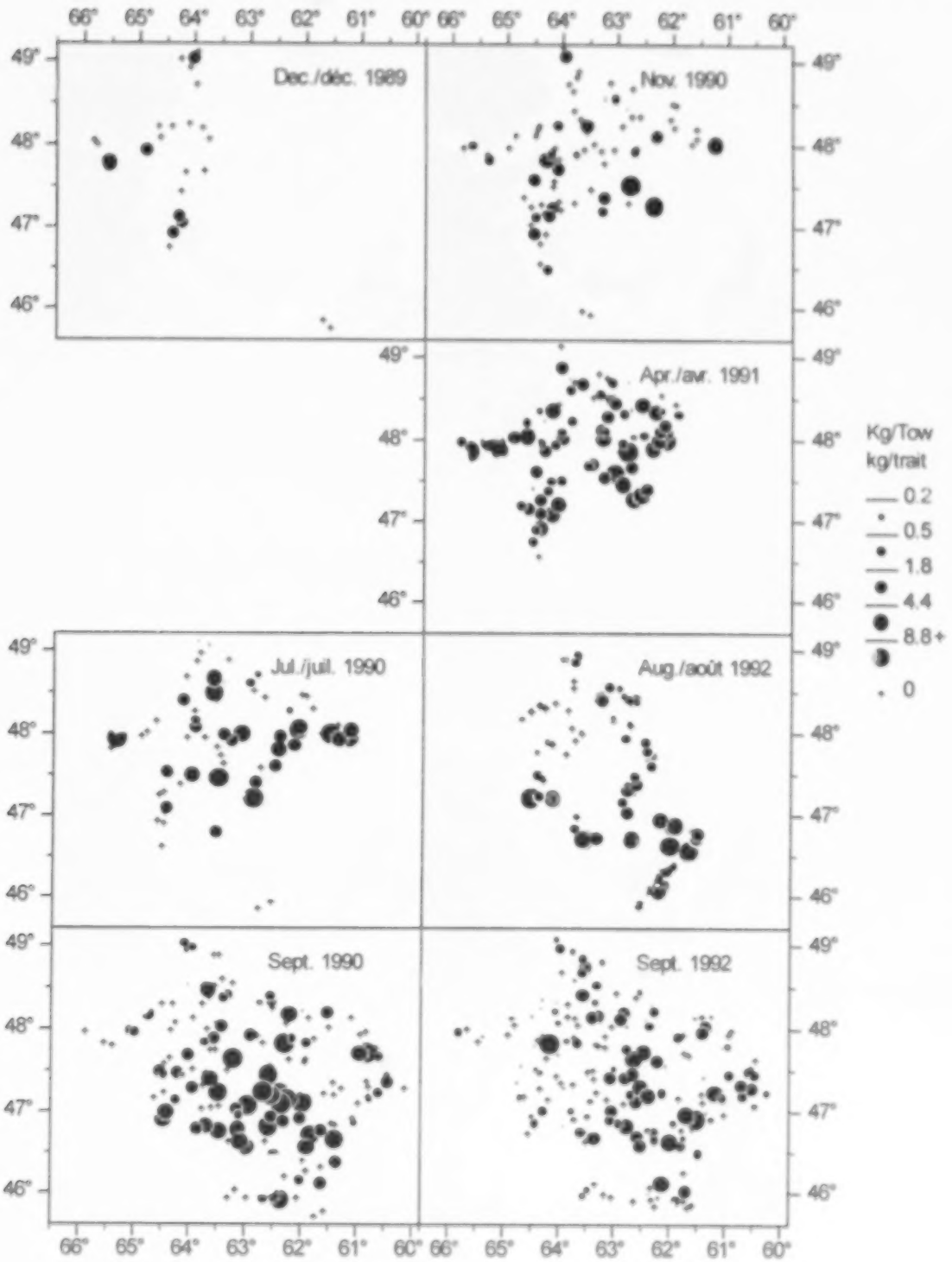

Figure 85b. S.W. Gulf of St. Lawrence seasonal distribution of catches (kg/tow) of Starfish, Asteroidea

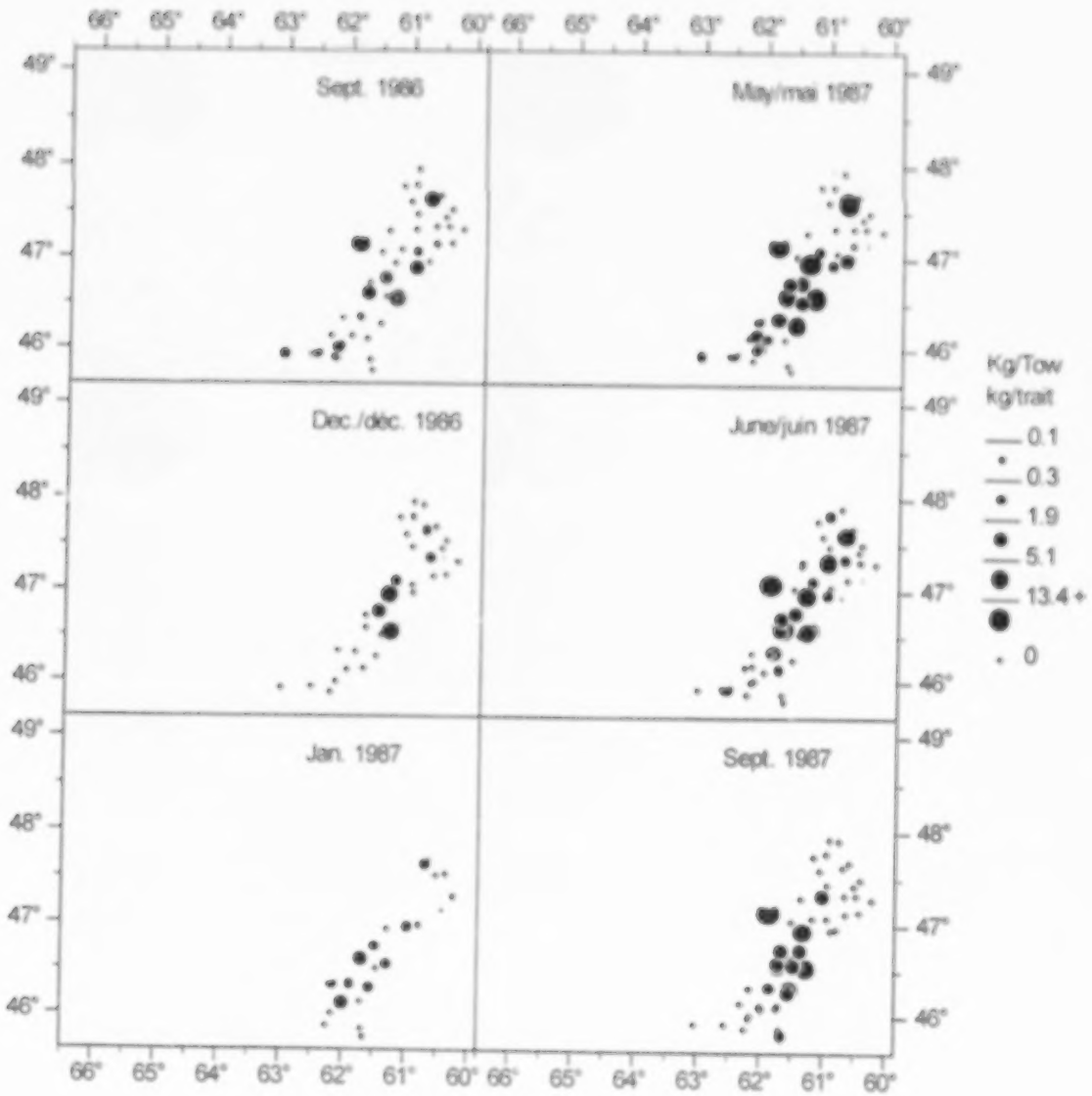

Figure 86a. S.E. Gulf of St. Lawrence seasonal distribution of catches (kg/tow) of Sun Stars, *Solaster sp.*

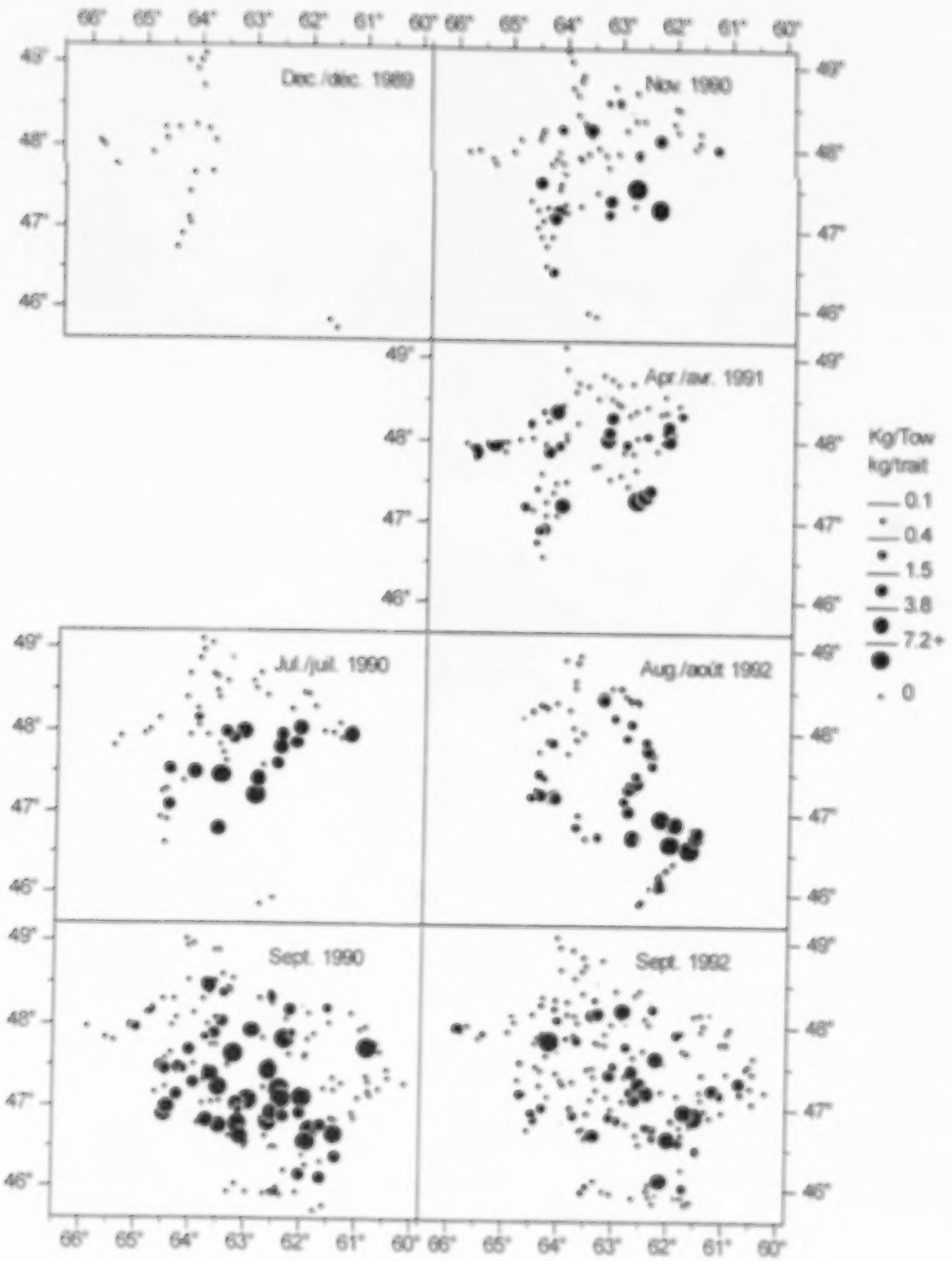

Figure 86b. S.W. Gulf of St. Lawrence seasonal distribution of catches (kg/tow) of Sun Stars, *Solaster sp.*

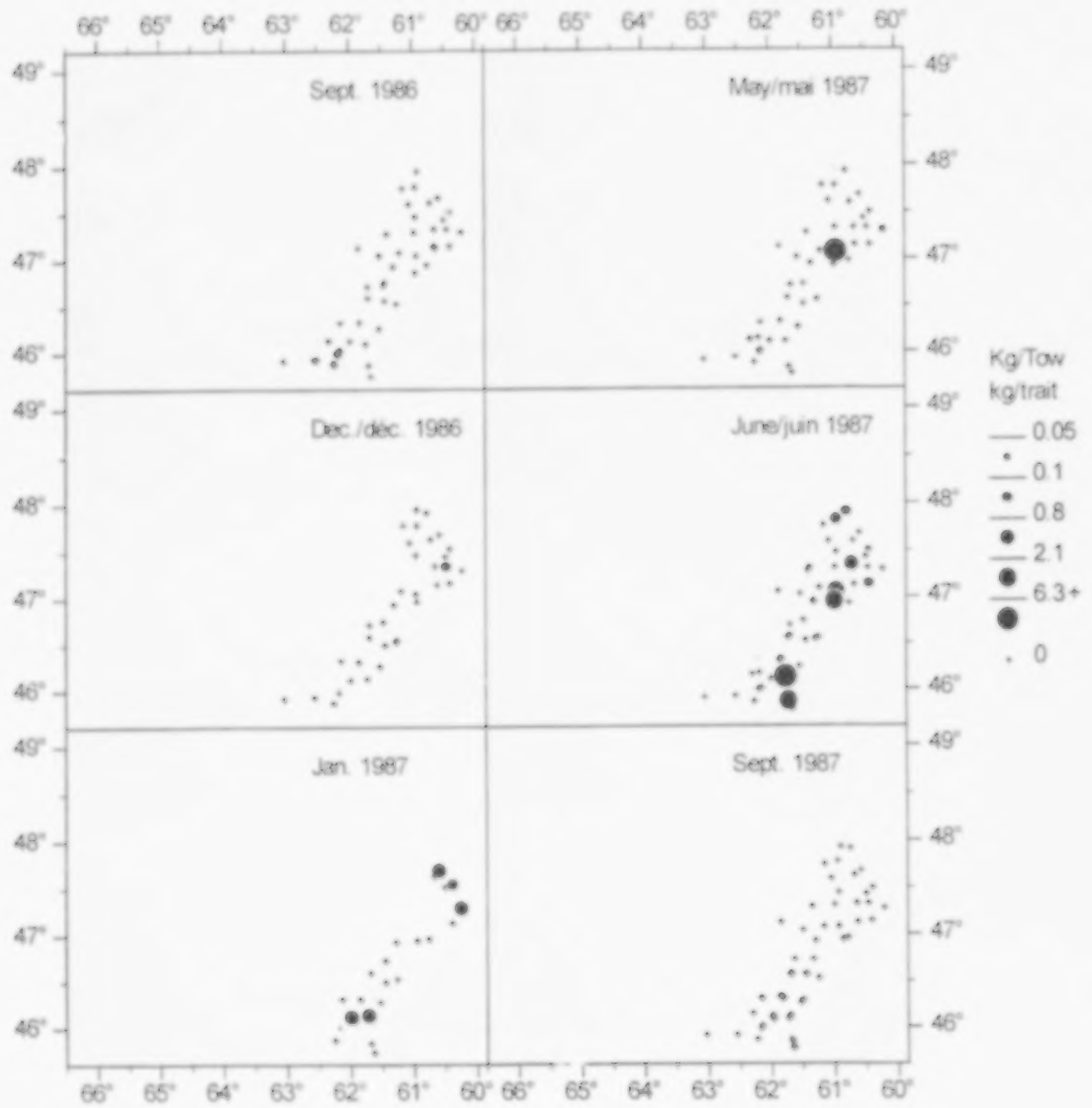

Figure 87a. S.E. Gulf of St. Lawrence seasonal distribution of catches (kg/tow) of Mud Star, *Ctenodiscus crispatus*

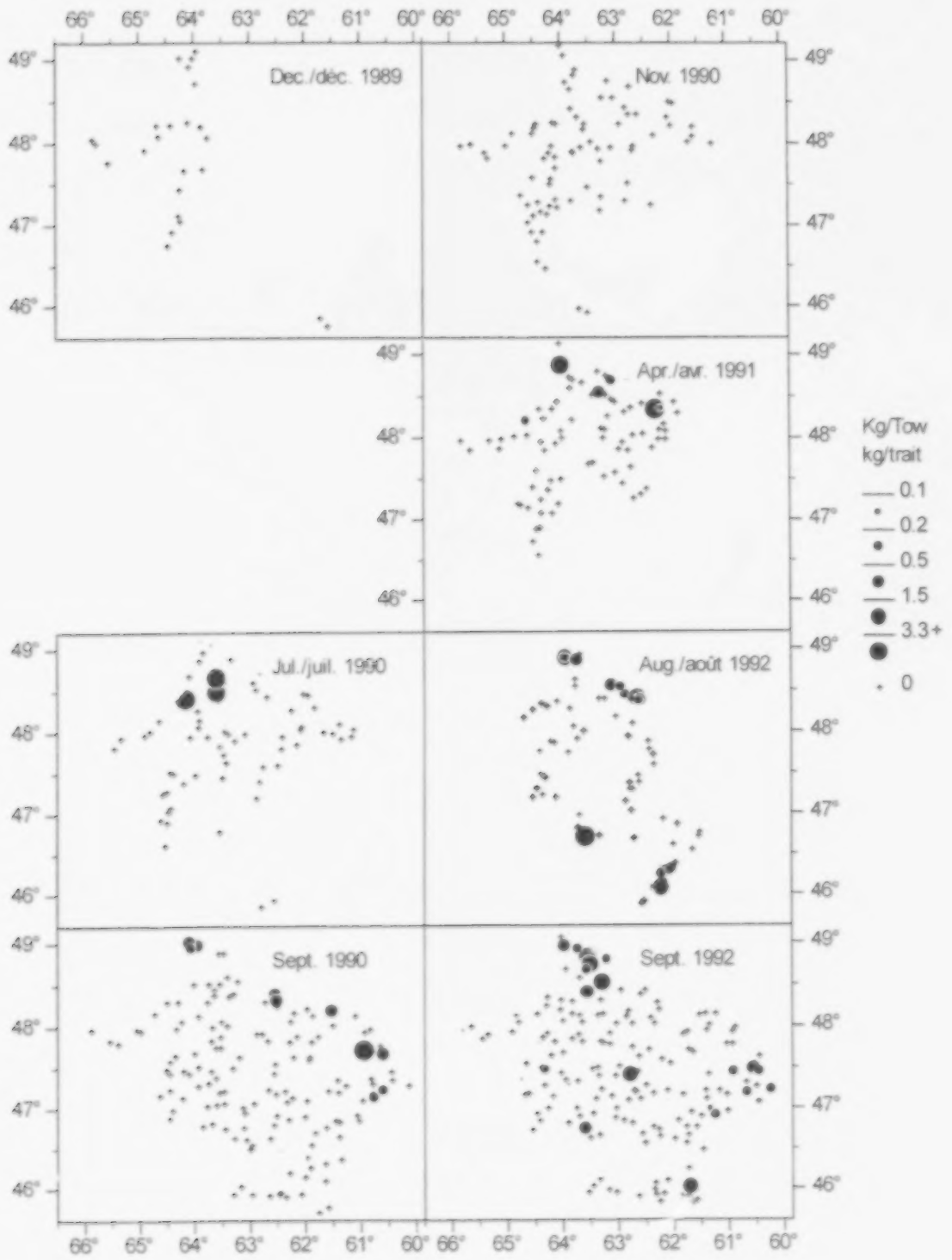

Figure 87b. S.W. Gulf of St. Lawrence seasonal distribution of catches (kg/tow) of Mud Star, *Ctenodiscus crispatus*

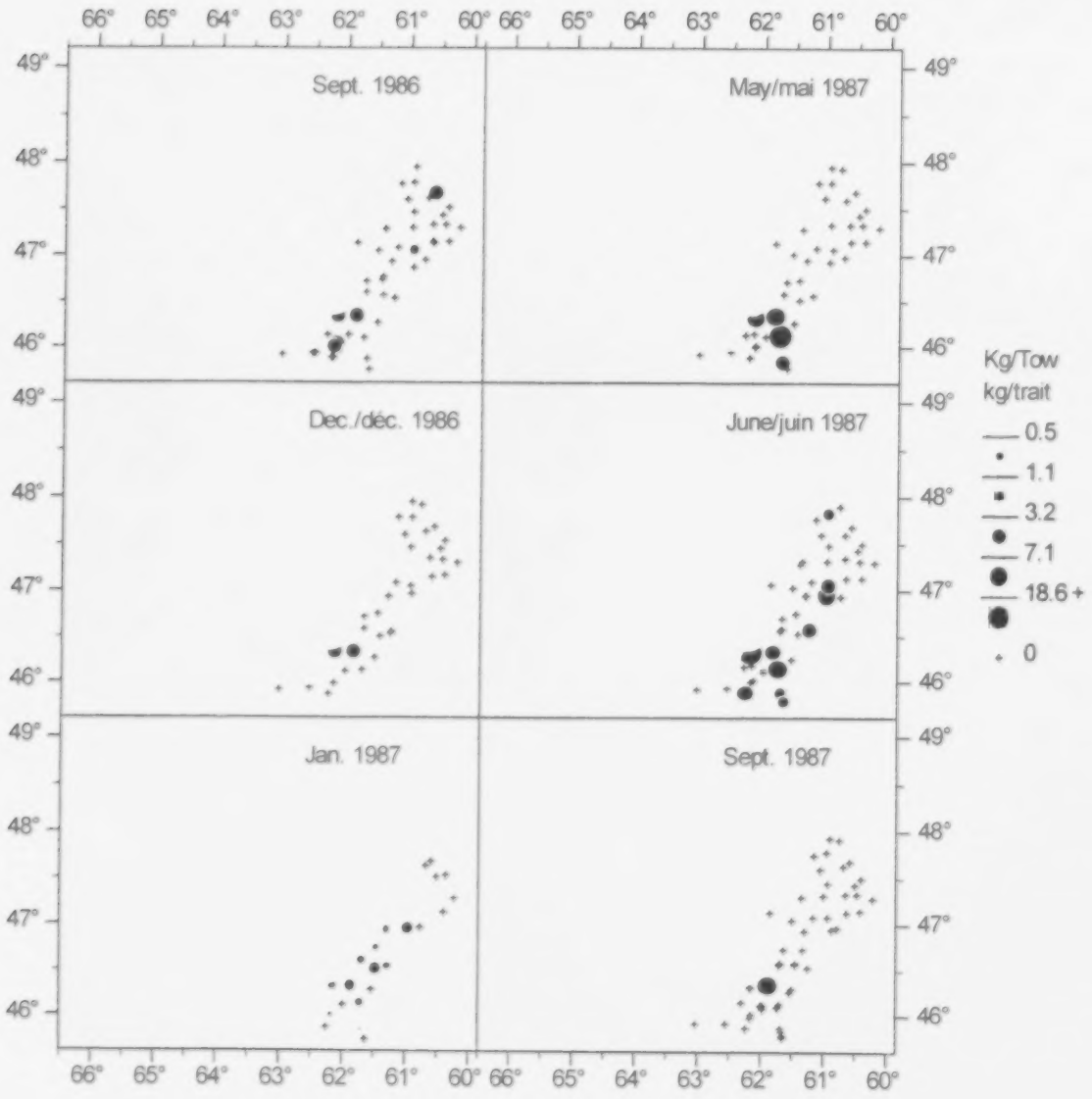

Figure 88a. S.E. Gulf of St. Lawrence seasonal distribution of catches (kg/tow) of Brittle Stars, Ophiuroidea

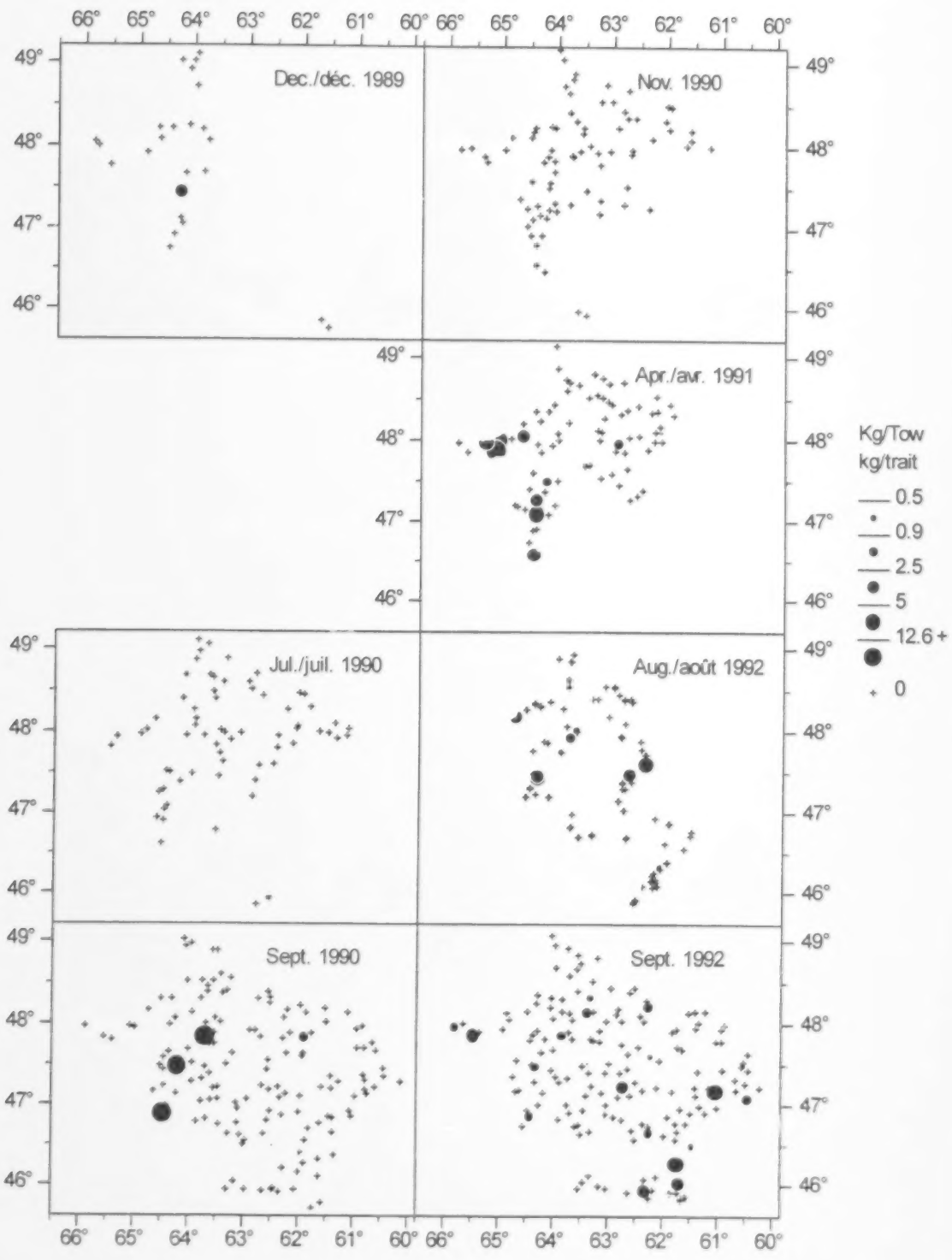

Figure 88b. S.W. Gulf of St. Lawrence seasonal distribution of catches (kg/tow) of Brittle Stars, Ophiuroidea

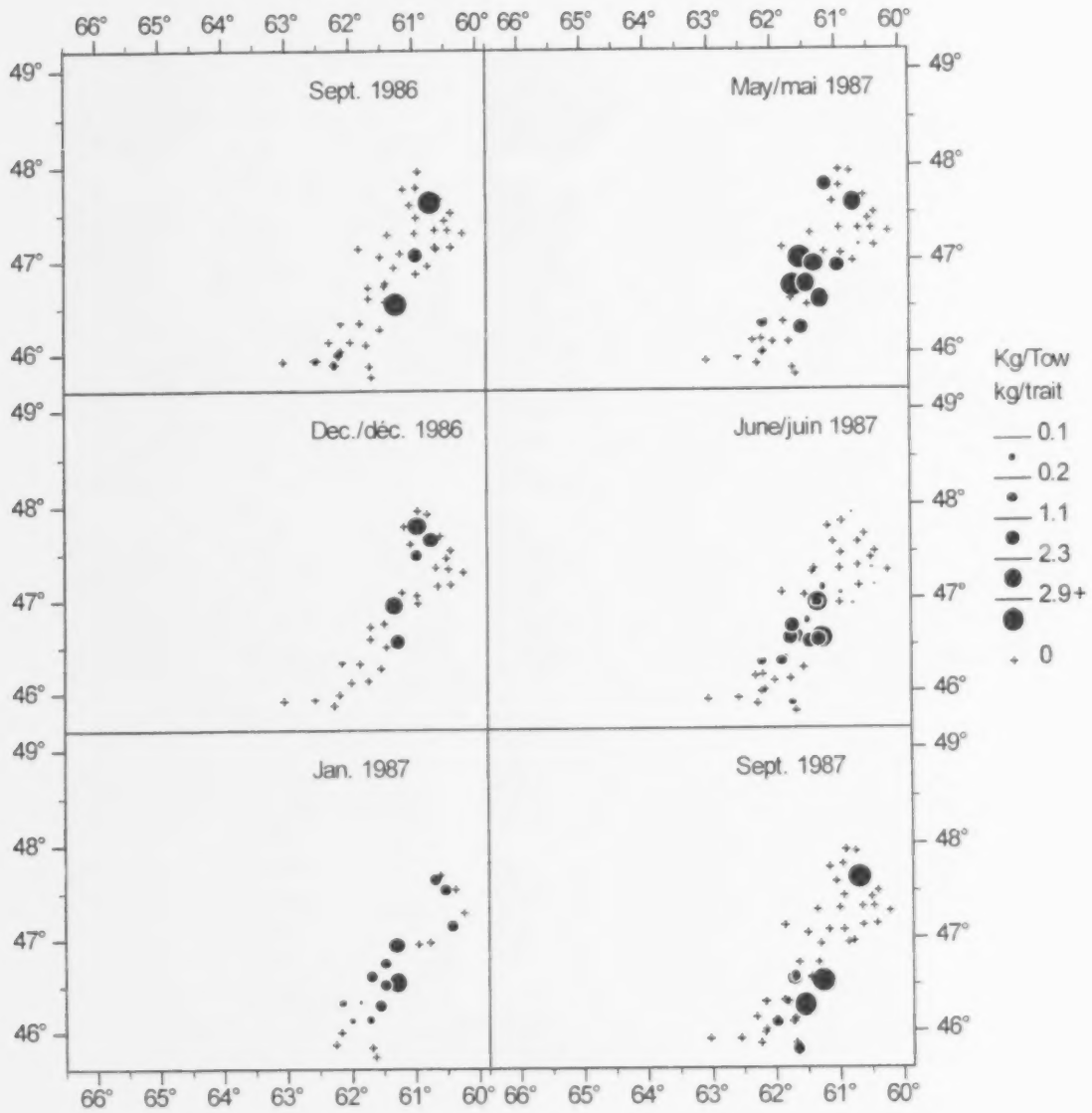

Figure 89a. S.E. Gulf of St. Lawrence seasonal distribution of catches (kg/tow) of Basket Stars, Gorgonocephalida and Asteronychidae

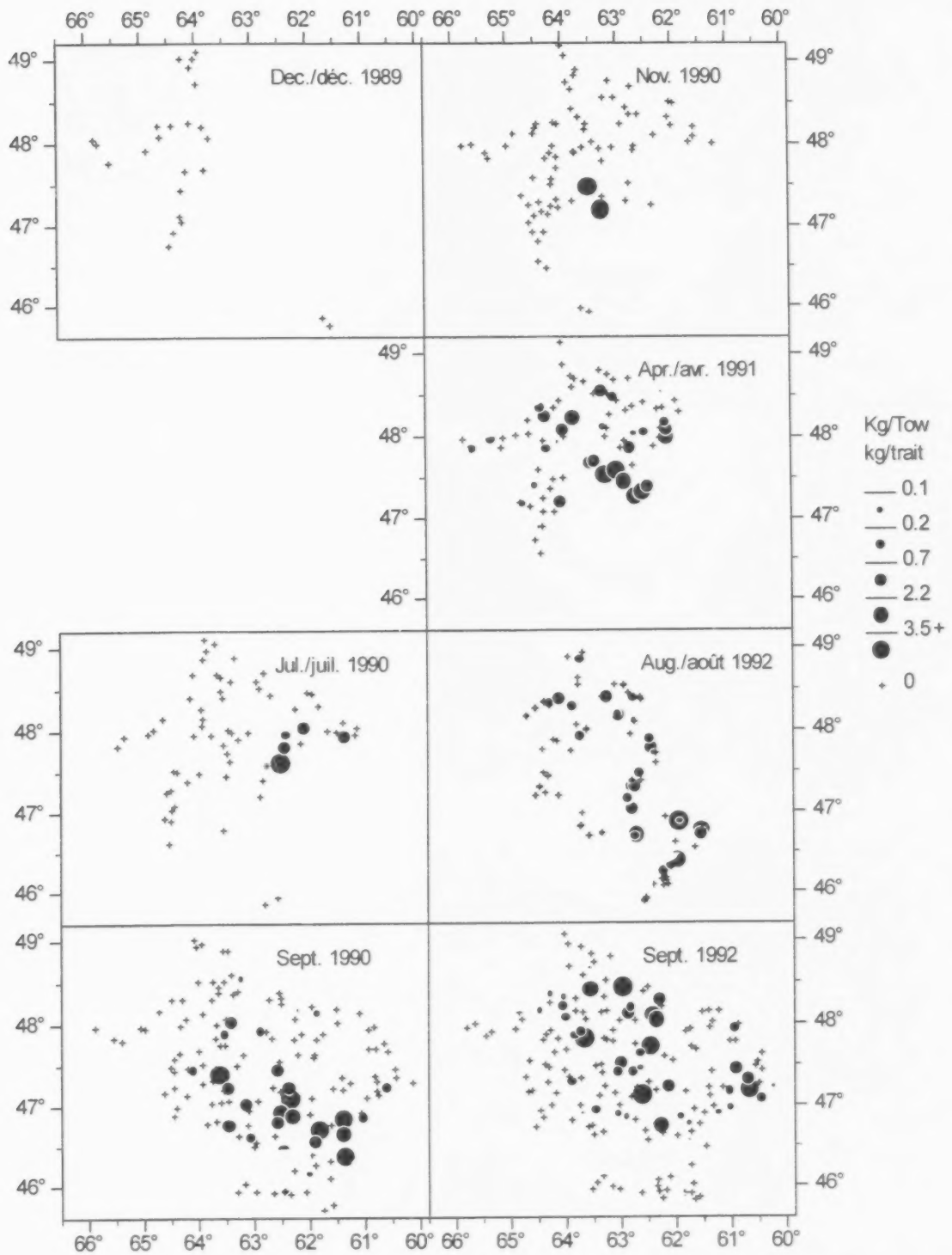

Figure 89b. S.W. Gulf of St. Lawrence seasonal distribution of catches (kg/tow) of Basket Stars, Gorgonocephalida and Asteronychidae

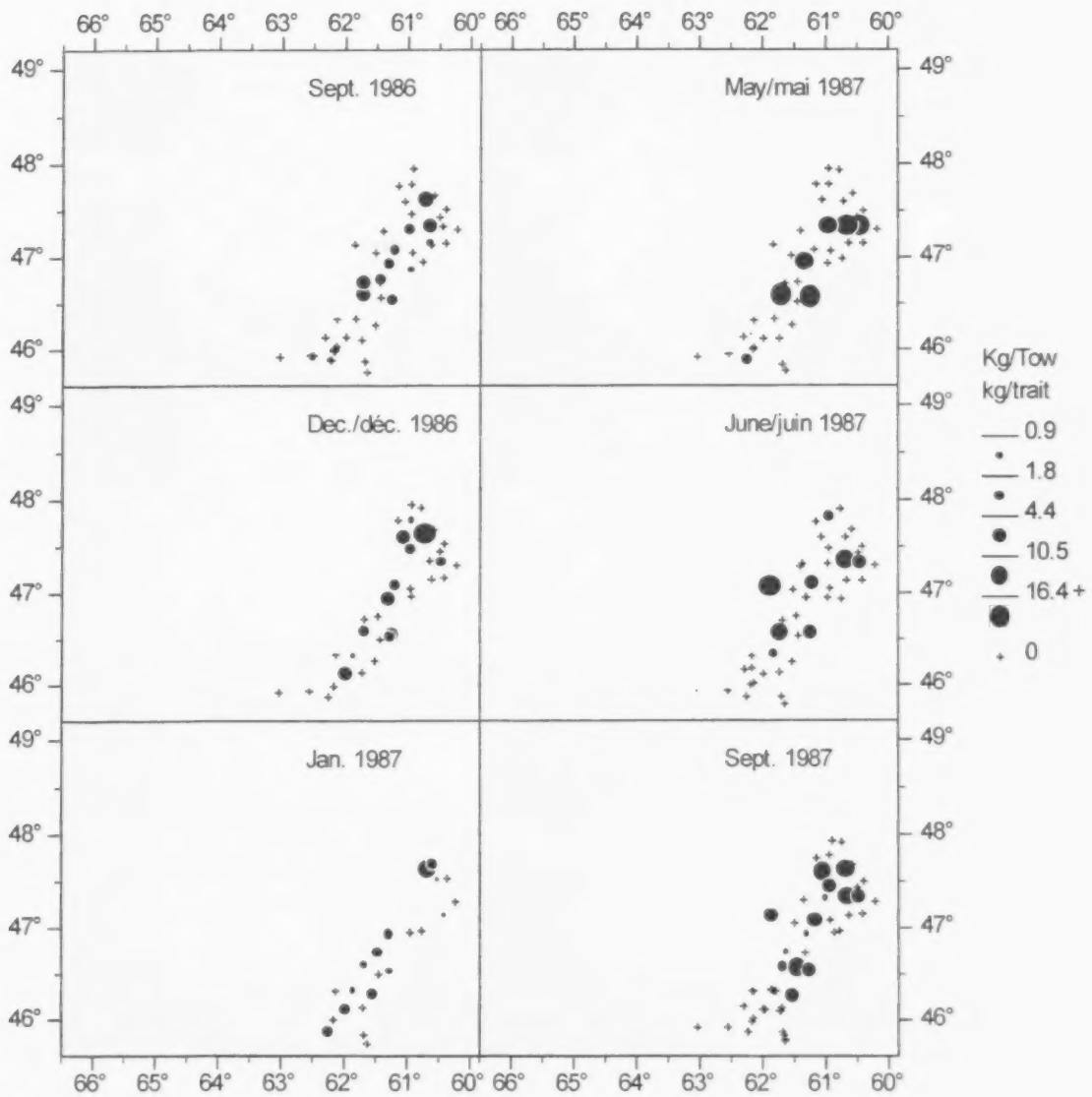

Figure 90a. S.E. Gulf of St. Lawrence seasonal distribution of catches (kg/tow) of Sea Urchins, *Strongylocentrotus sp.*

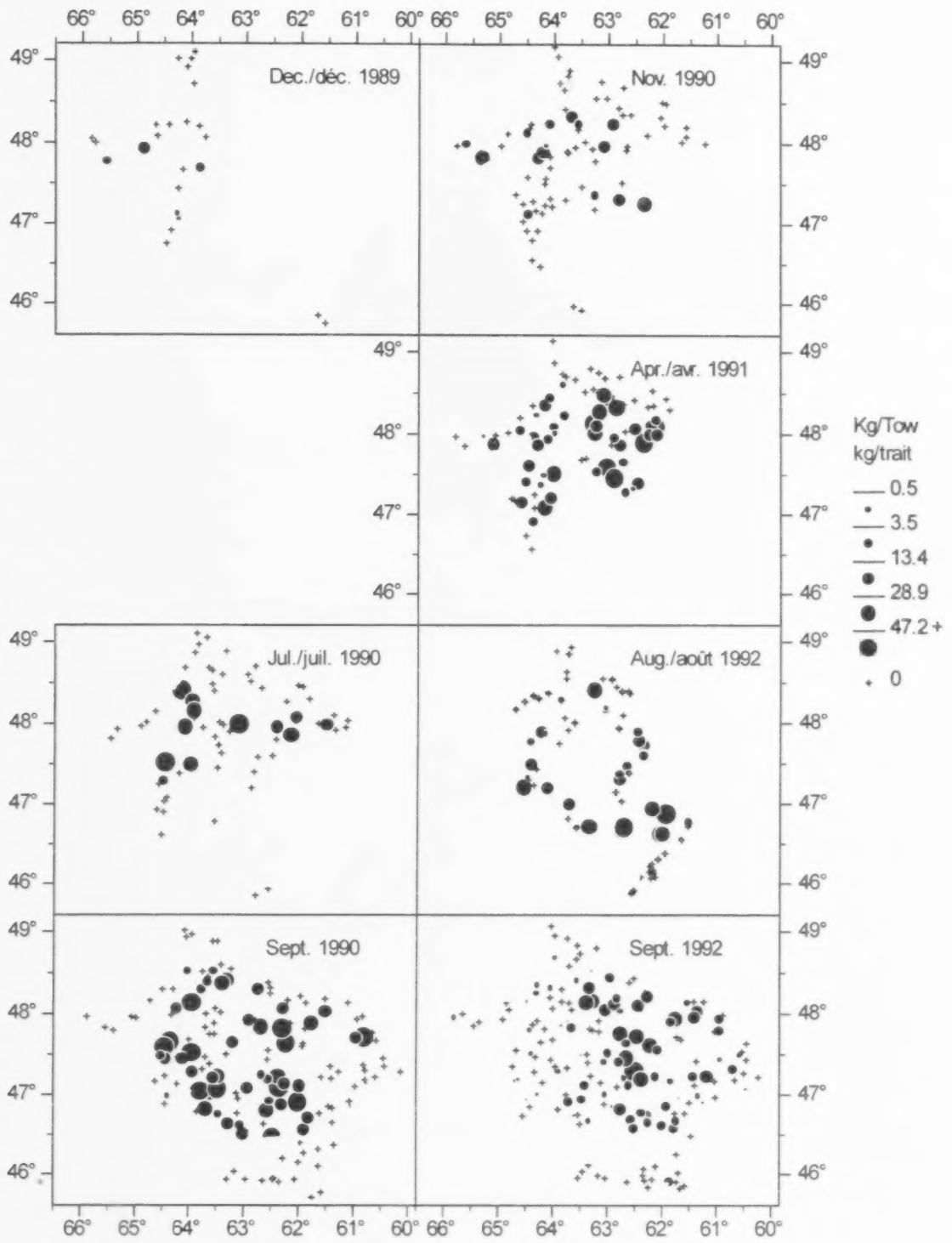

Figure 90b. S.W. Gulf of St. Lawrence seasonal distribution of catches (kg/tow) of Sea Urchins, *Strongylocentrotus sp.*

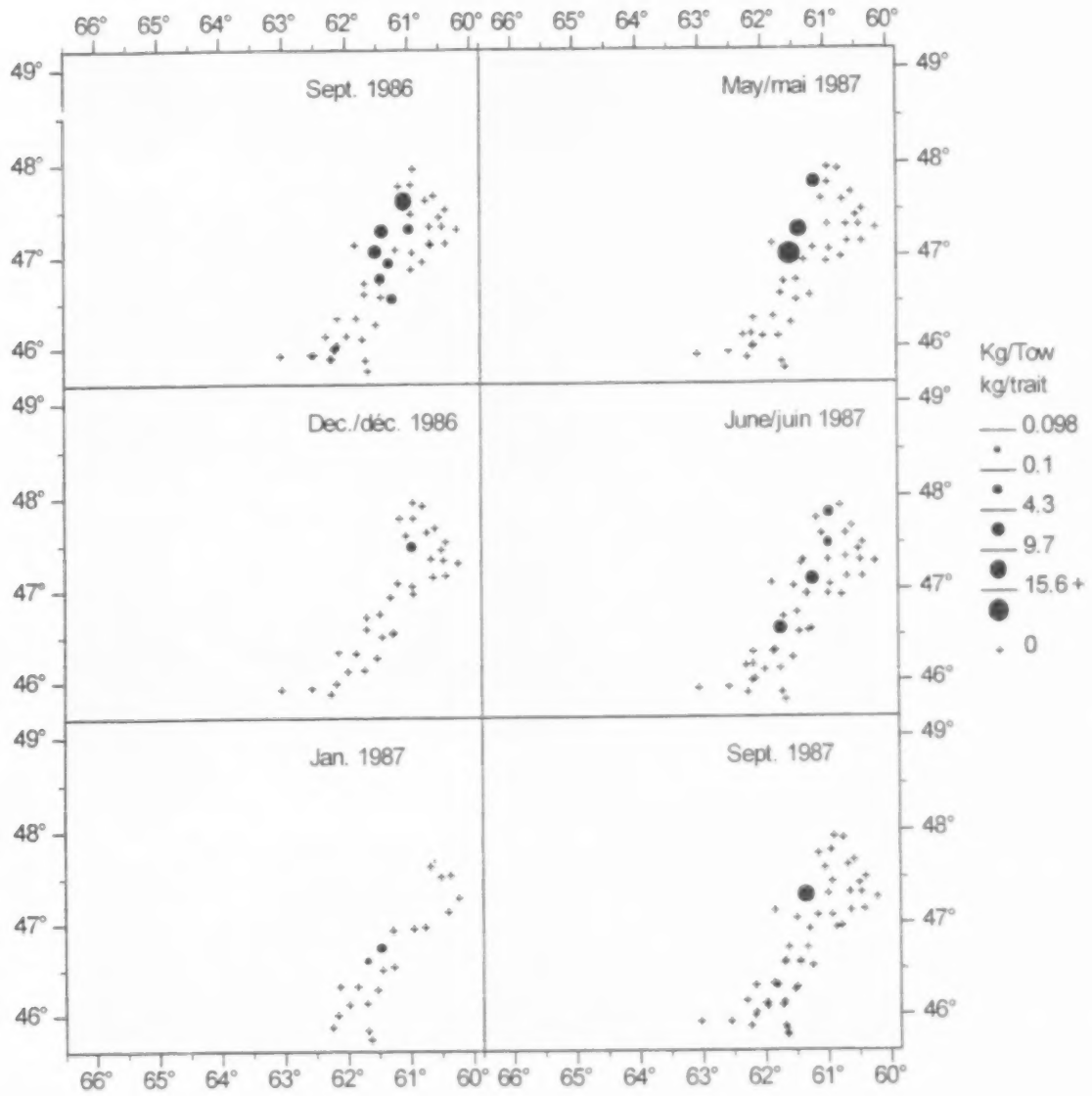

Figure 91a. S.E. Gulf of St. Lawrence seasonal distribution of catches (kg/tow) of Sand Dollars, Clypeasteroida

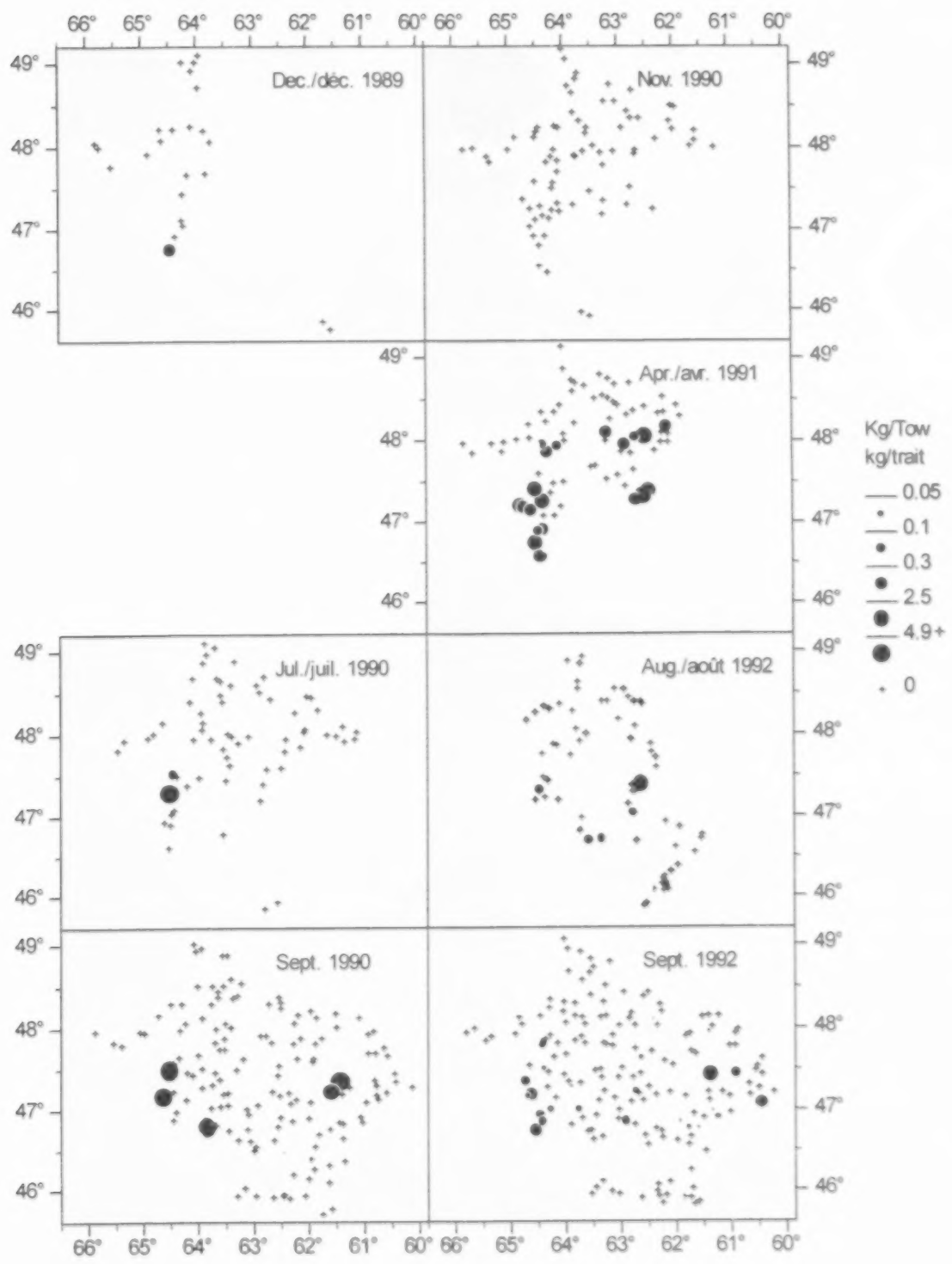

Figure 91b. S.W. Gulf of St. Lawrence seasonal distribution of catches (kg/tow) of Sand Dollars, Clypeasteroida

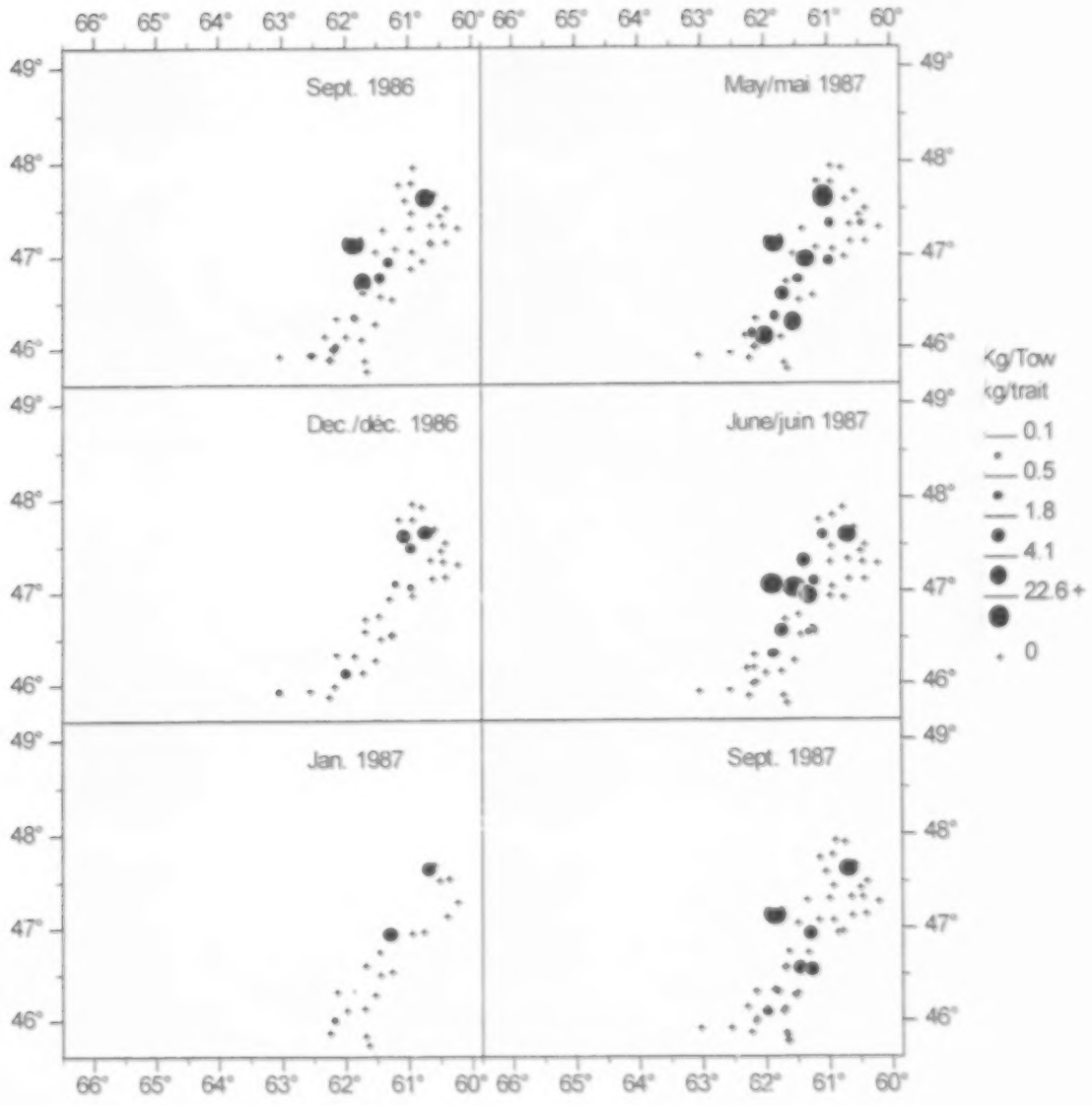

Figure 92a. S.E. Gulf of St. Lawrence seasonal distribution of catches (kg/tow) of Sea Cucumbers, Holothuroidea

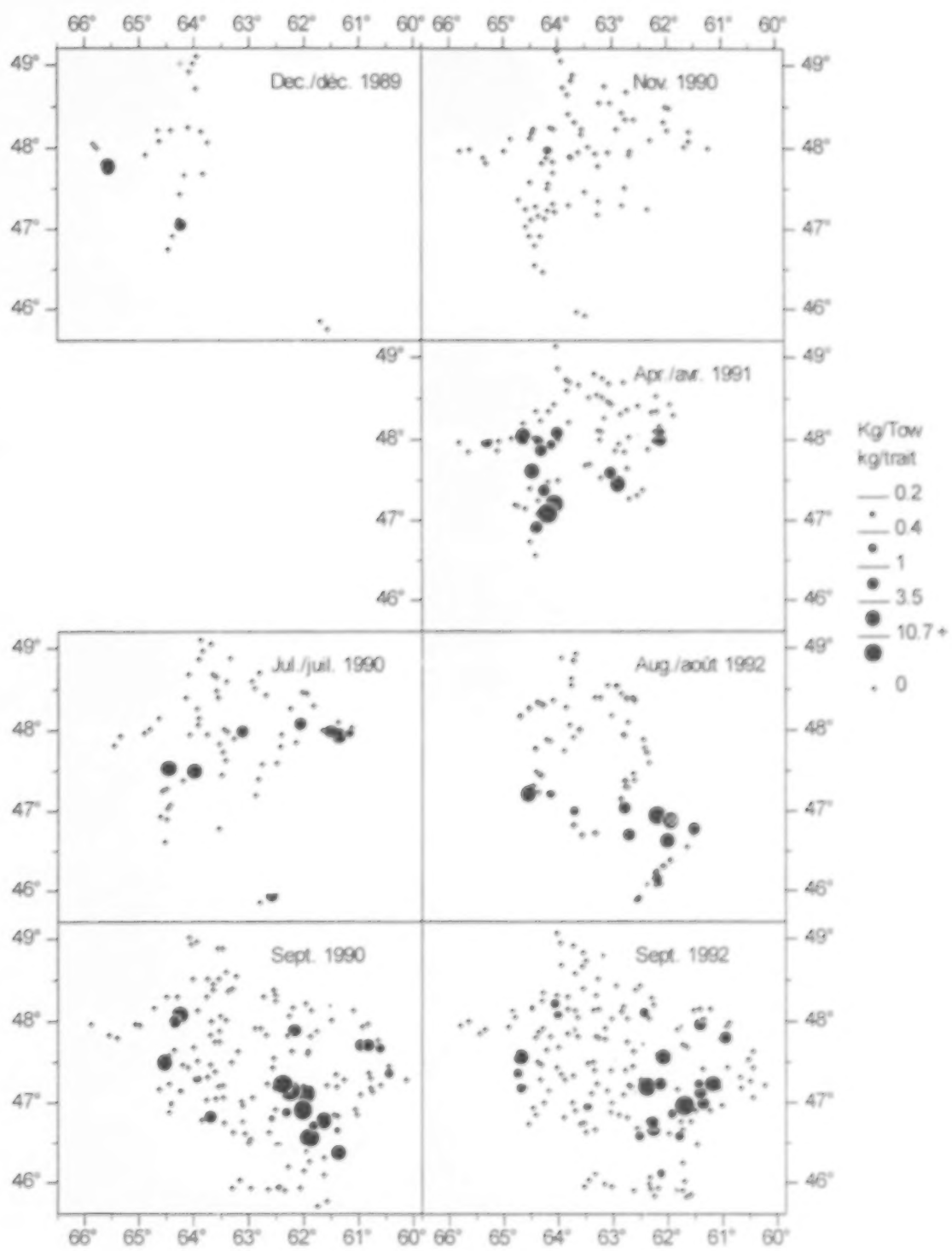

Figure 92b. S.W. Gulf of St. Lawrence seasonal distribution of catches (kg/tow) of Sea Cucumbers, Holothuroidea

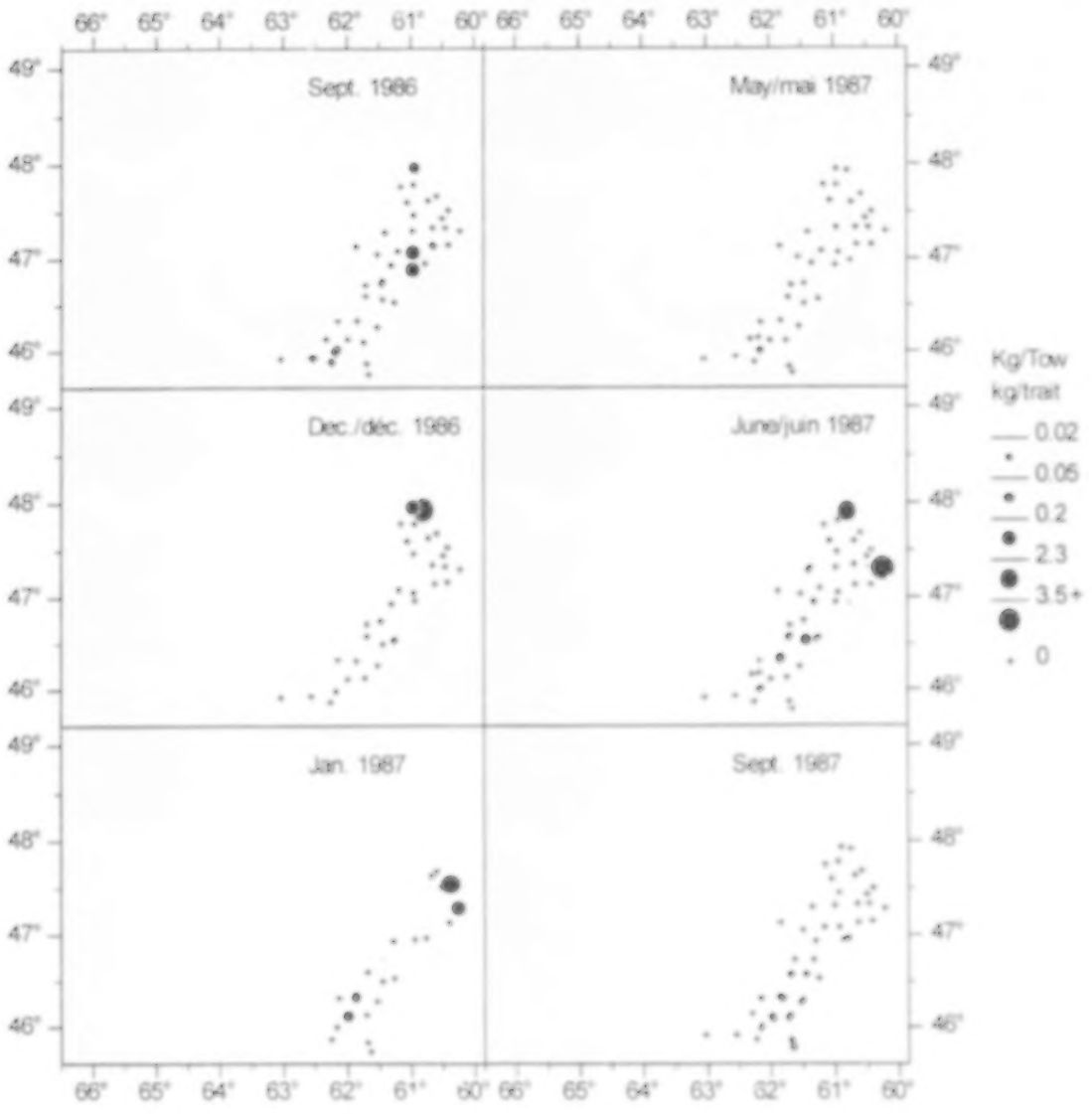

Figure 93a. S.E. Gulf of St. Lawrence seasonal distribution of catches (kg/tow) of Sea Anemones, Anthozoa

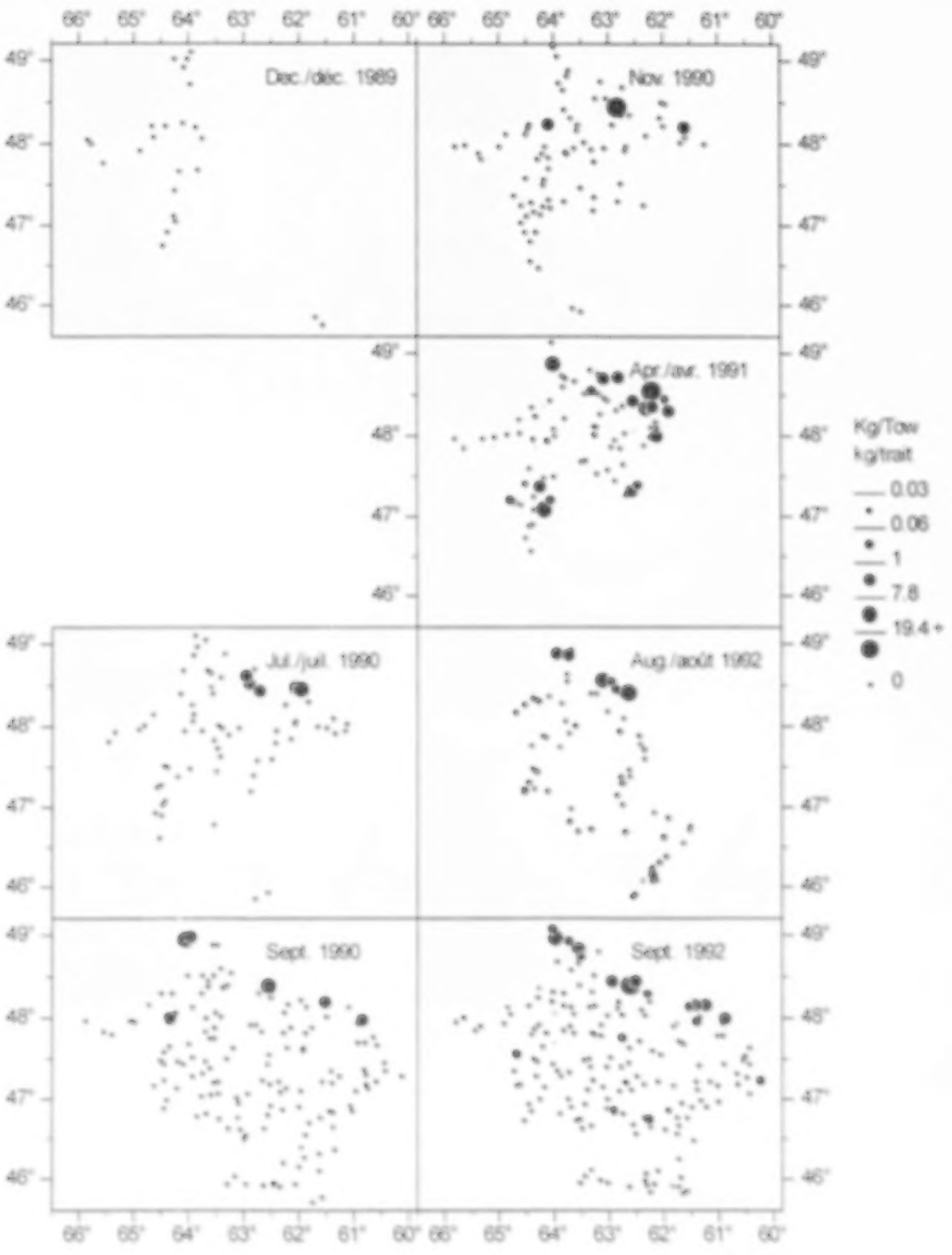

Figure 93b. S.W. Gulf of St. Lawrence seasonal distribution of catches (kg/tow) of Sea Anemones, Anthozoa

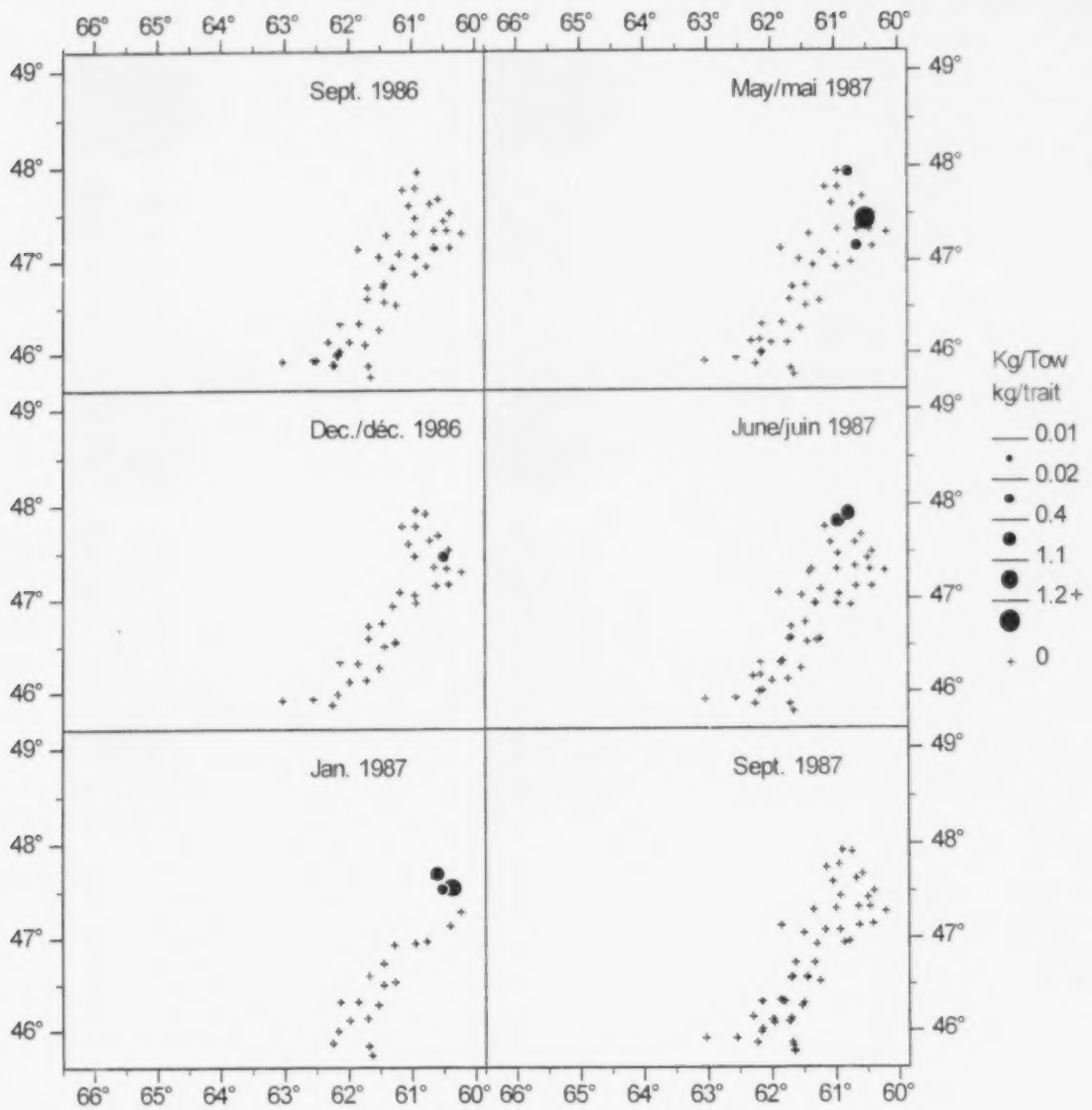

Figure 94a. S.E. Gulf of St. Lawrence seasonal distribution of catches (kg/tow) of Great Sea Pen, *Pennatula borealis*

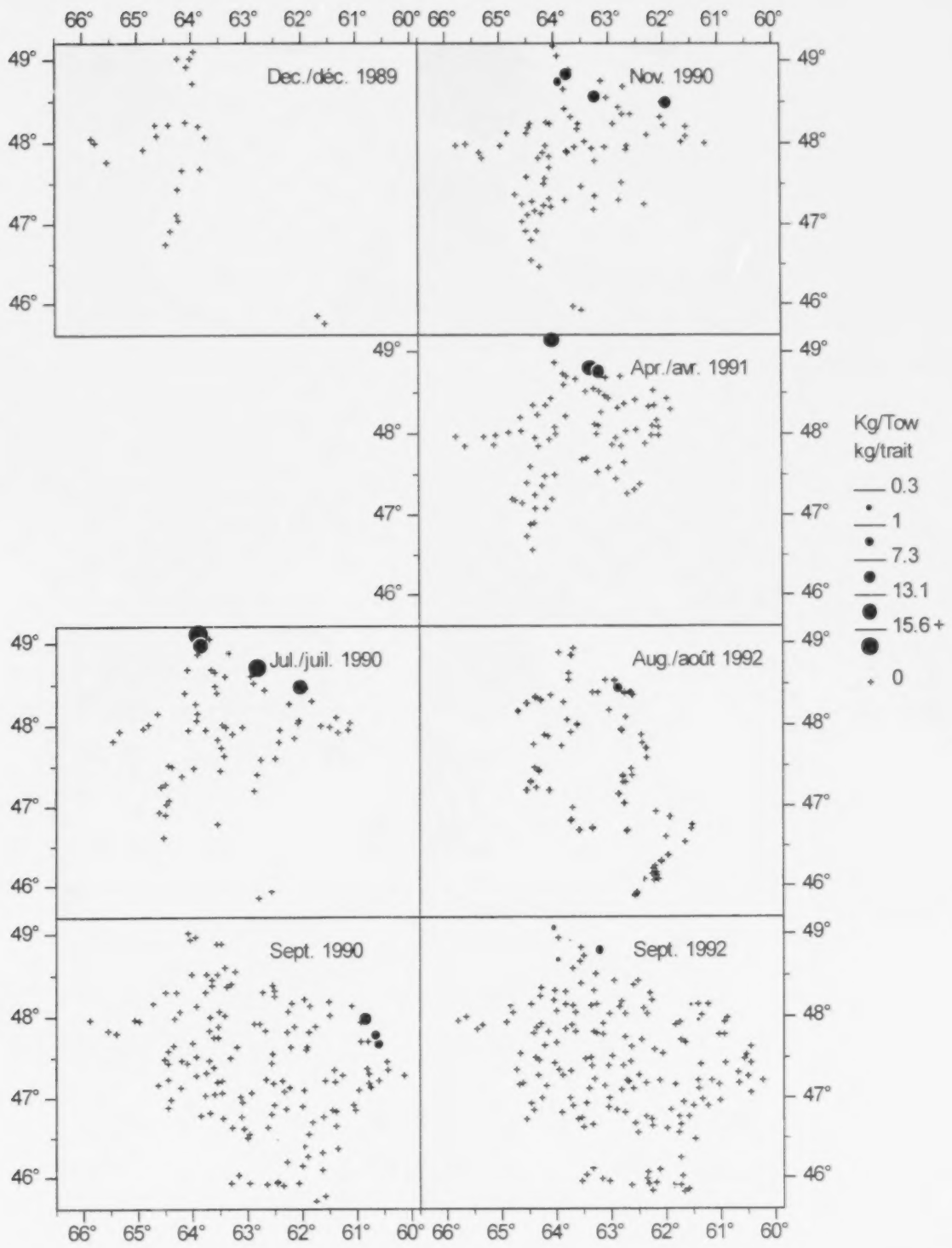

Figure 94b. S.W. Gulf of St. Lawrence seasonal distribution of catches (kg/tow) of Great Sea Pen, *Pennatula borealis*

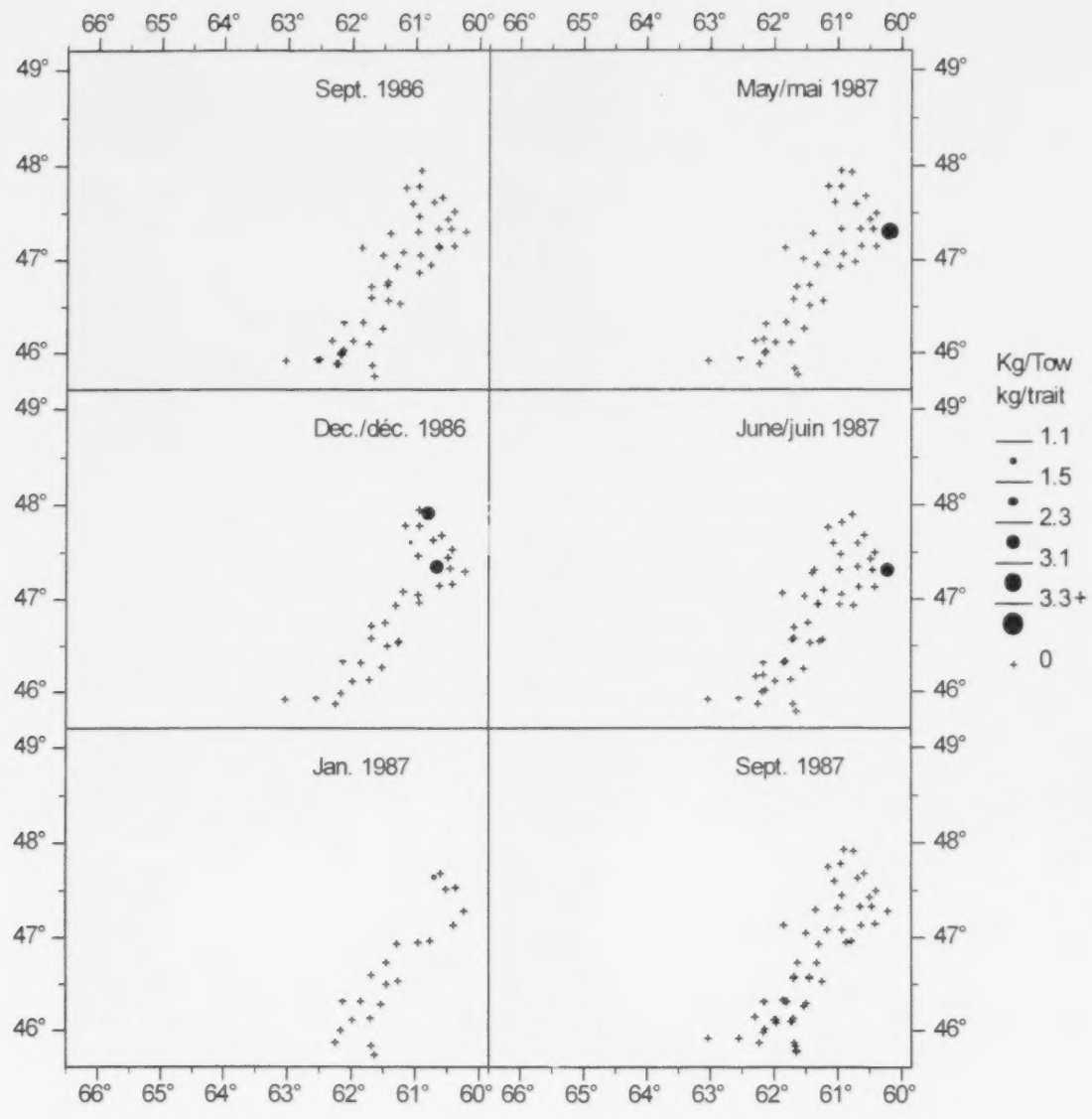

Figure 95a. S.E. Gulf of St. Lawrence seasonal distribution of catches (kg/tow) of Large Jellyfish, Scyphozoa

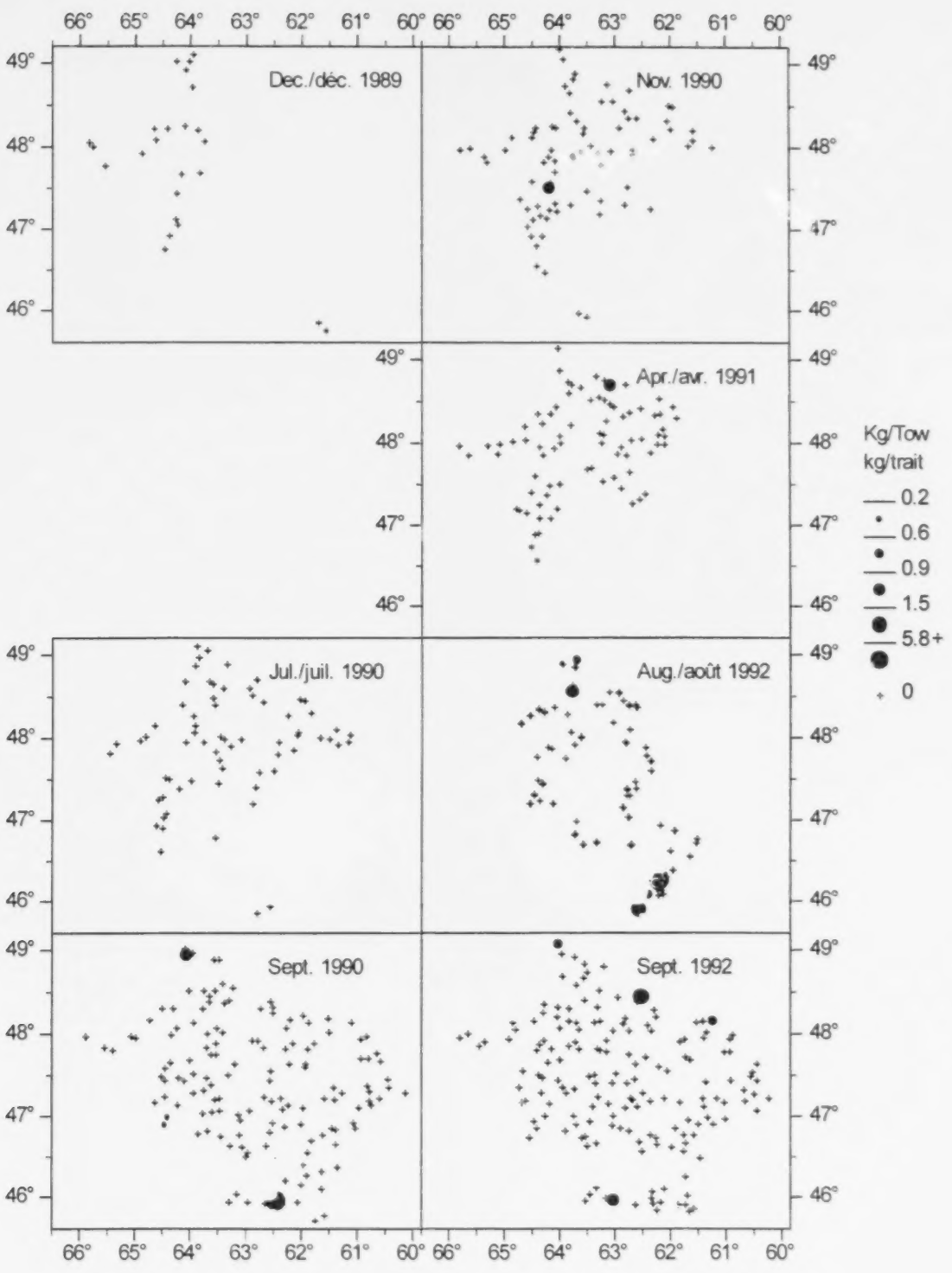

Figure 95b. S.W. Gulf of St. Lawrence seasonal distribution of catches (kg/tow) of Large Jellyfish, Scyphozoa

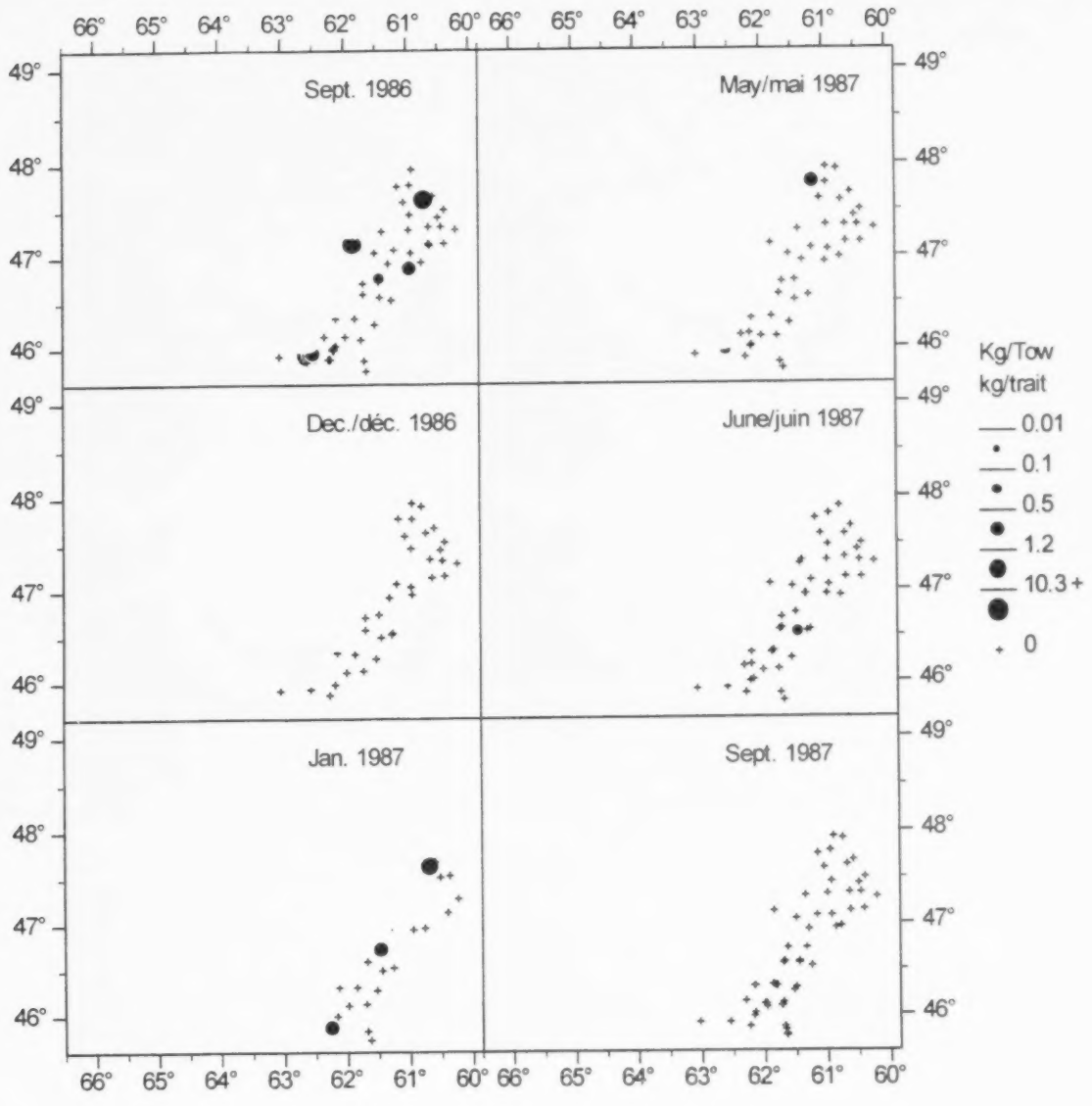

Figure 96a. S.E. Gulf of St. Lawrence seasonal distribution of catches (kg/tow) of Sponges, Porifera

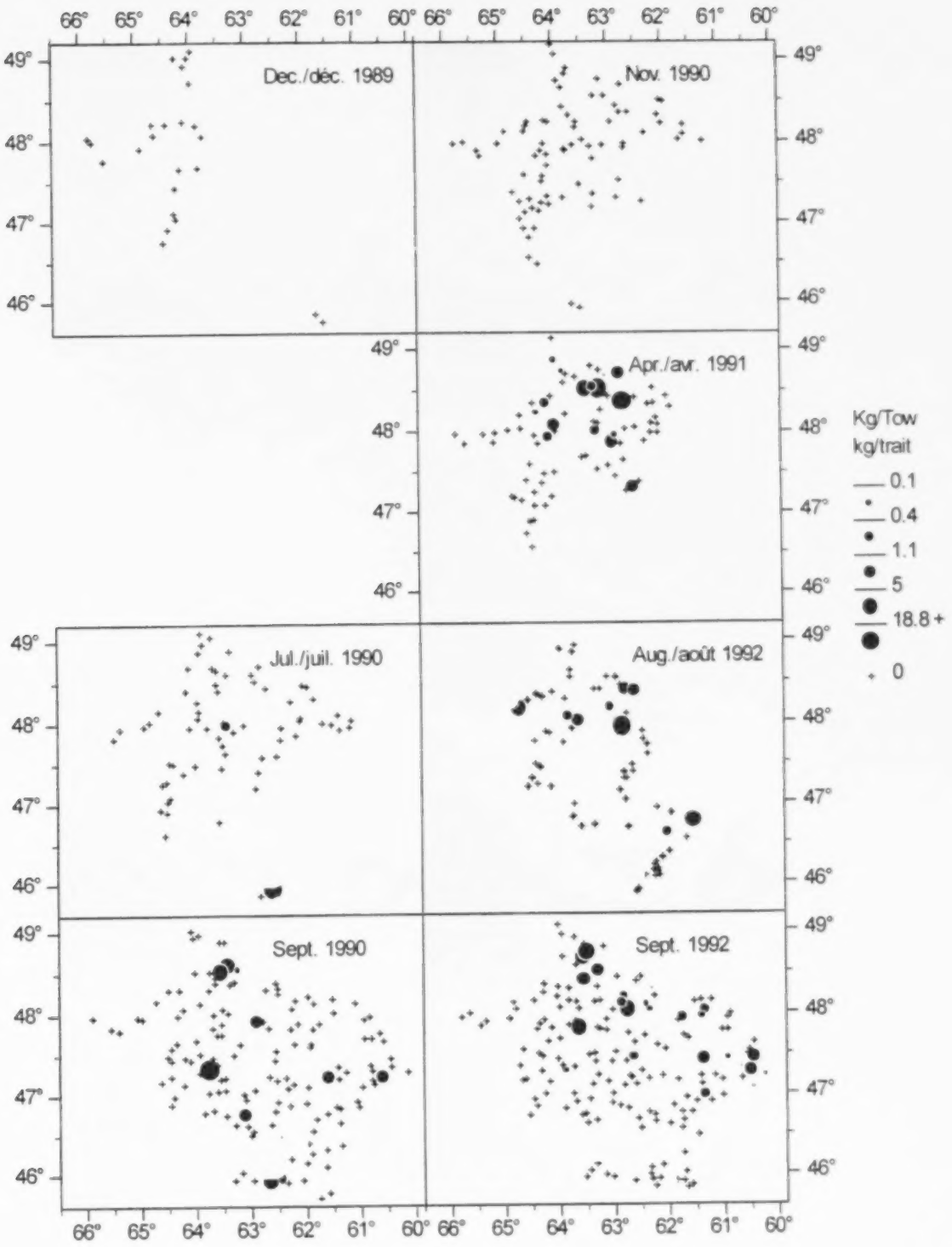

Figure 96b. S.W. Gulf of St. Lawrence seasonal distribution of catches (kg/tow) of Sponges, Porifera

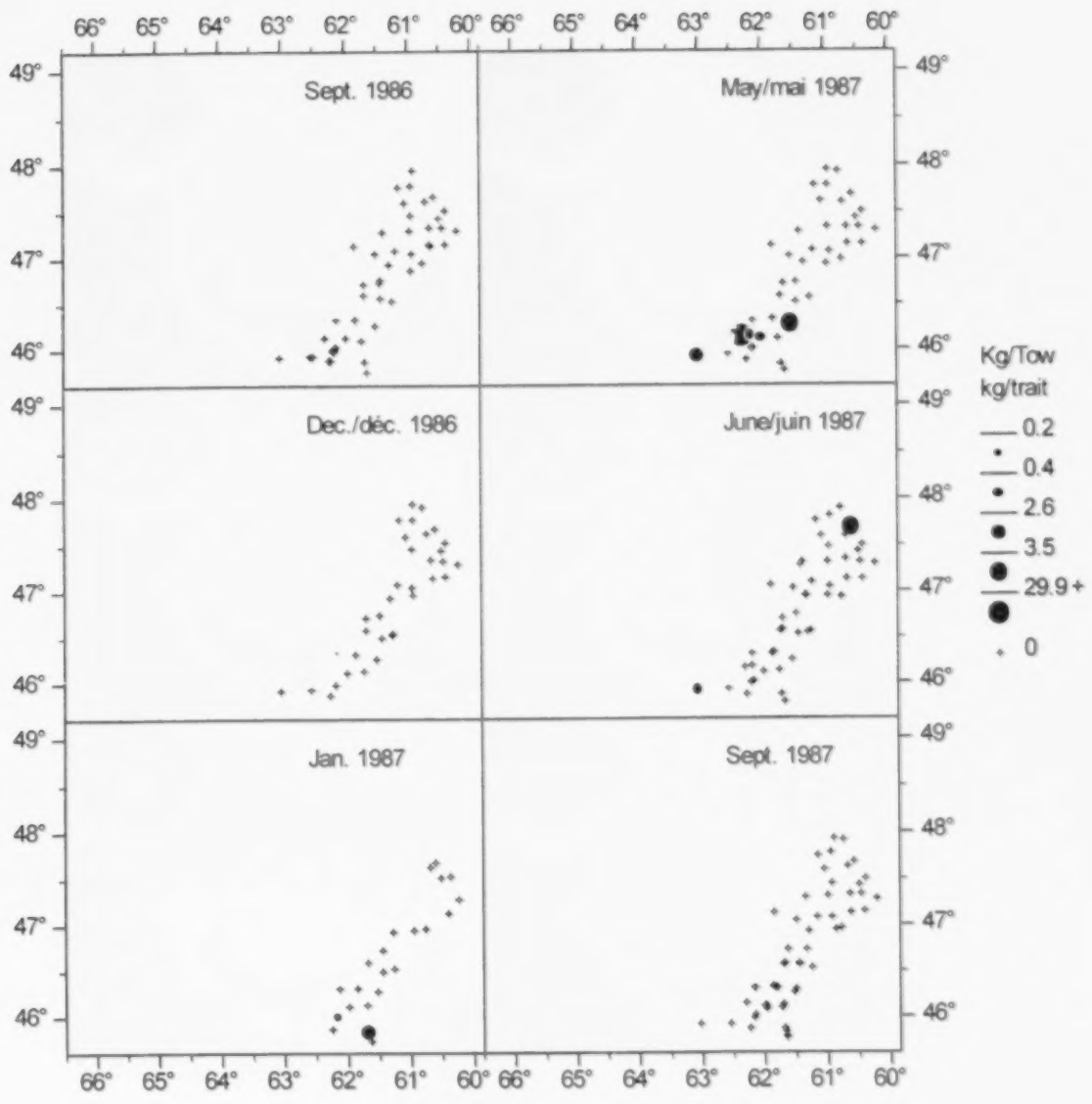

Figure 97a. S.E. Gulf of St. Lawrence seasonal distribution of catches (kg/tow) of Algae and Kelp, Thallophyta

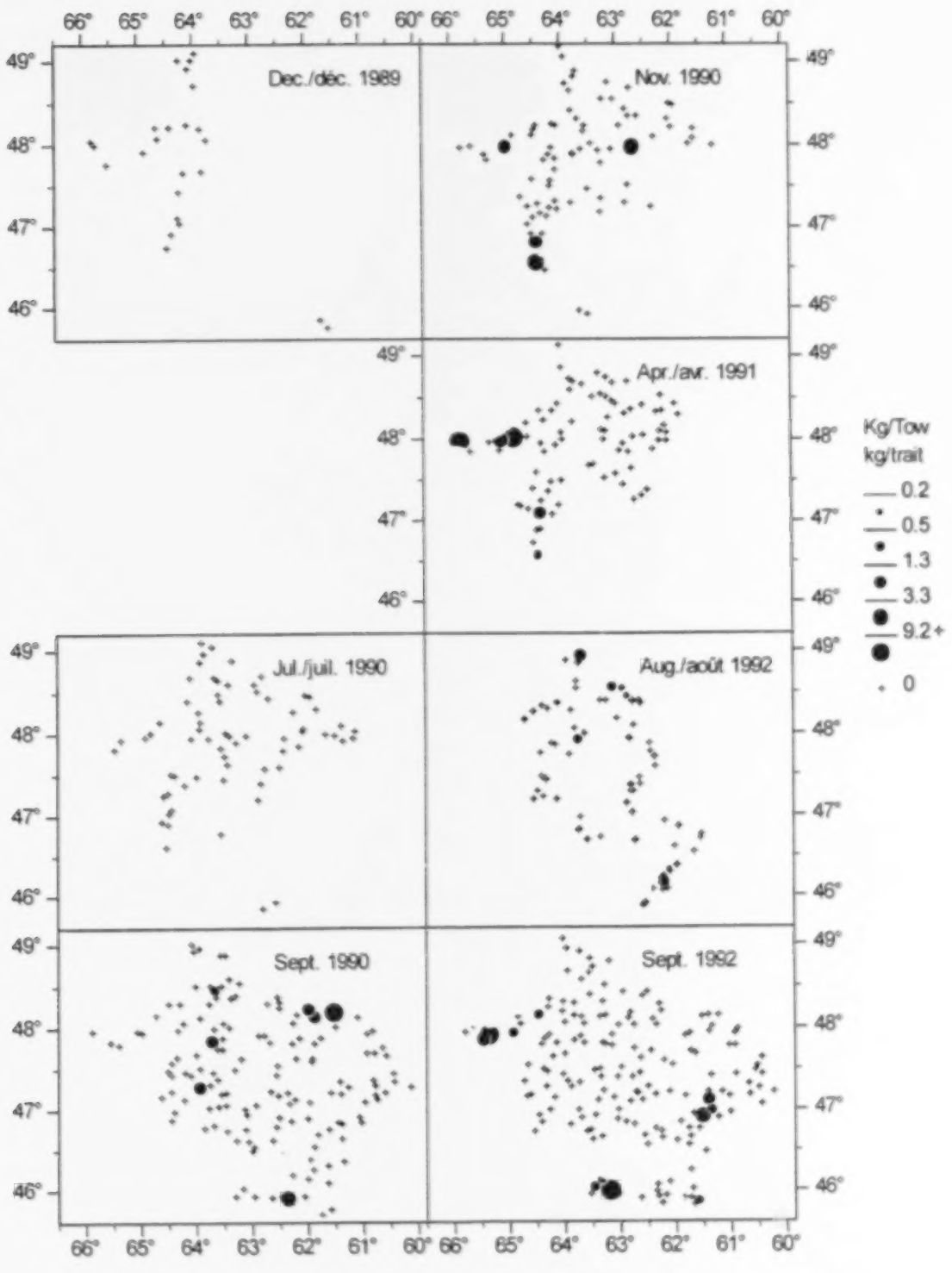

Figure 97b. S.W. Gulf of St. Lawrence seasonal distribution of catches (kg/tow) of Algae and Kelp. Thallophyta